

New and Enhanced Features in AlliedWare Plus 5.4.4 Major and Minor Versions



AlliedWare Plus
OPERATING SYSTEM

» SBx8100 Series » SBx908 Series » x900 Series » x610 Series
» x510 Series » IX5 » x310 Series » x230 Series » x210 Series
» 5.4.4-0.1 » 5.4.4-1.1 » 5.4.4-2.3 » 5.4.4-3.5

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Contents

AlliedWare Plus Version 5.4.4-3.5..... 1

Introduction	2
New Features and Enhancements	4
Enhancements to Processing of Next-hop Updates	4
Login Security Enhancements	4
VRRPv3 Secondary IPv6 Address	5
Web Authentication Unmatched Proxy Setting Detection	6
Important Considerations Before Upgrading to this Version	7
Licensing	7
Upgrading a VCStack	7
Forming or extending a VCStack	7
ISSU (In-Service Software Upgrade)	8
AMF software version compatibility	8
Upgrading all switches in an AMF network	8
Licensing this Software Version on an SBx908 Switch	9
Licensing this Software Version on a Control Card for an SBx8100 Series Switch	11
Installing this Software Version	13
Installing the GUI	15

AlliedWare Plus Version 5.4.4-2.3..... 17

Introduction	18
Key New Features and Enhancements	20
Web-Authentication Enhancements	20
Stack-Local-VLANs Enhancements	22
Important Considerations Before Upgrading to this Version	24
Licensing	24
Upgrading a VCStack	24
Forming or extending a VCStack	24
ISSU (In-Service Software Upgrade)	25
AMF software version compatibility	25
Upgrading all switches in an AMF network	25
Licensing this Software Version on an SBx908 Switch	26
Licensing this Software Version on a Control Card for an SBx8100 Series Switch	28
Installing this Software Version	30
Installing the GUI	32

Authentication Commands 35

Stack-Local-VLANs Commands 49

AlliedWare Plus Version 5.4.4-1.1 51

Introduction	52
New Products in 5.4.4-1.1	54
x230 Series Enterprise PoE+ Gigabit Edge Switches	54
x310 Series Stackable Access Switches	54
SBx81XS16 Line Card for SBx8100 Series	55
Key New Features and Enhancements	56
Cable Fault Locator	56
In-Service Software Upgrade (ISSU)	56
AMF Enhancements	56

Release Licensing.....	57
Important Considerations Before Upgrading to this Version	58
Licensing	58
Upgrading a VCStack.....	58
Forming or extending a VCStack	58
ISSU (In-Service Software Upgrade)	58
AMF software version compatibility	59
Upgrading all switches in an AMF network	59
Changes in this Version.....	60
Licensing this Software Version on an SBx908 Switch	67
Licensing this Software Version on a Control Card for an SBx8100 Series Switch	69
Installing this Software Version	71
Installing the GUI.....	73
Cable Fault Locator Introduction	75
Introduction to the Cable Fault Locator	76
Capabilities.....	76
TDR Operating Principles.....	76
Using the Cable Fault Locator	77
Cable Fault Locator Commands	79
ISSU Introduction	83
Introduction to ISSU	84
Operating Requirements	84
Key Concepts.....	84
ISSU Operation.....	85
ISSU Phases	85
Initiating the ISSU Automatic Phase	87
Initiating the ISSU Manual Phase	88
Errors and Recovery	88
Automating the ISSU Process Using Triggers	90
Related Information	91
ISSU Commands	93
AMF Introduction and Configuration	109
Introduction to AMF.....	110
AMF Supported Products and Software Versions	110
Key Benefits of AMF.....	111
Unified Command-Line	111
Configuration Backup and Recovery	111
Rolling-Reboot Upgrade	111
Node Provisioning.....	112
AMF Terminology and Introduction	113
AMF Network.....	113
AMF Nodes.....	113
Node Licensing	113
Node Interconnection.....	114
AMF Domains	114
AMF Network Operational Concepts.....	116
Retention and Use of the 'Manager' Username	116
Working-Set	116
AMF Restricted-Login.....	117
Loop-Free Data Plane	117
Aggregators	117

VCStacks	117
AMF External Removable Media	117
AMF Interaction with QoS and ACLs	118
NTP and AMF	118
Configuring AMF	119
AMF Tunneling (Virtual Links)	125
Verifying the AMF Network	129
Configuring Multiple Nodes at the Same Time: the Unified CLI	131
Working-Set Groups	132
Executing Commands on Working-Sets	133
Interactive Commands	136
AMF Backups	137
Using External Media Storage	137
Performing a Manual Backup	138
Backing up to Remote Servers	142
Node Recovery	144
Automatic Node Recovery	144
Restoring a Node to a "Clean" State	145
Manual Node Recovery	146
Node Recovery on VCStacks	147
AMF Safe Configuration	148
Detecting AMF Safe Configuration Operation	148
AMF Safe Configuration Procedures	148
Undoing an AMF Safe Configuration	149
Rolling-Reboot Firmware Upgrade	151
Performing a Rolling-Reboot Upgrade	153
Node Provisioning	155

AMF Commands..... 161

Introduction	163
AMF Naming Convention	163

AlliedWare Plus Version 5.4.4-0.1257

Introduction	258
New Products	260
x210 Series Enterprise Edge Switches	260
x510-GPX Series Stackable Gigabit Switches with PoE+	260
x510-28GSX Stackable Fiber Gigabit Switch	261
x510DP-52GTX Stackable Gigabit Switch for Datacenters	261
IX5-28GPX High Availability Video Surveillance PoE+ Switch	262
XEM-24T for x900 Series and SBx908 Switches	262
SwitchBlade x8106 Advanced Layer 3+ Chassis Switch	262
SBx81CFC960 control card for SBx8100 Series	263
SBx81GT40 line card for SBx8100 Series	263
Key New Features and Enhancements	265
Allied Telesis Management Framework	265
VCStack Plus for SBx8100 Series with CFC960 Control Cards	265
VRF-Lite	265
BGP4+	266
IPv6 Hardware ACLs	266
Authentication Enhancements	266
Port Flapping Detection	266
Release Licensing	266
Important Considerations Before Upgrading to this Version	267
Licensing	267
Upgrading a VCStack	267

Forming or extending a VCStack	267
AMF software version compatibility	268
Upgrading all switches in an AMF network	268
Changes in this Version.....	269
Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch.....	289
Licensing this Software Version on a Control Card on an SBx8100 Series Switch.....	291
Installing this Software Version	293
Installing the GUI.....	295

AlliedWare Plus Version 5.4.4-3.5

For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, x310 Series, x230 Series and x210 Series Switches

Contents

Introduction	2
New Features and Enhancements	4
Enhancements to Processing of Next-hop Updates	4
Login Security Enhancements.....	4
VRRPv3 Secondary IPv6 Address.....	5
Web Authentication Unmatched Proxy Setting Detection	6
Important Considerations Before Upgrading to this Version	7
Licensing	7
Upgrading a VCStack.....	7
Forming or extending a VCStack.....	7
ISSU (In-Service Software Upgrade)	8
AMF software version compatibility	8
Upgrading all switches in an AMF network.....	8
Licensing this Software Version on an SBx908 Switch	9
Licensing this Software Version on a Control Card for an SBx8100 Series Switch	11
Installing this Software Version.....	13
Installing the GUI	15

Introduction

This section of this release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-3.5 since version 5.4.4-2.3. For more information, see the Software Reference for your switch. Software file details for this version are listed in [Table 1](#) below.



Caution: Software version 5.4.4-3.5 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- [“Licensing this Software Version on an SBx908 Switch” on page 9](#) and
- [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 11.](#)

Table 1: Switch models and software file names

Models	Series	Software File	GUI File	Date
x210-9GT x210-16GT x210-24GT	x210	x210-5.4.4-3.5.rel	x210-gui_544_08.jar	11/2014
x230-10GP x230-18GP	x230	x230-5.4.4-3.5.rel	x230-gui_544_02.jar	11/2014
x310-26FT x310-50FT x310-26FP x310-50FP	x310	x310-5.4.4-3.5.rel	x310-gui_544_06.jar	11/2014
IX5-28GPX	IX5	IX5-5.4.4-3.5.rel	IX5-gui_544_09.jar	11/2014
x510-28GTX x510-52GTX x510-28GPX x510-52GPX x510-28GSX x510DP-52GTX	x510	x510-5.4.4-3.5.rel	x510-gui_544_10.jar	11/2014
x610-24Ts x610-24Ts-PoE+ x610-24Ts/X x610-24Ts/X-PoE+ x610-24SPs/X x610-48Ts x610-48Ts-PoE+ x610-48Ts/X x610-48Ts/X-PoE+	x610	x610-5.4.4-3.5.rel	x610-gui_544_07.jar	11/2014
x900-12XT/S x900-24XS x900-24XT	x900	x900-5.4.4-3.5.rel	x900-gui_544_07.jar	11/2014
SwitchBlade x908	SBx908	SBx908-5.4.4-3.5.rel	x900-gui_544_07.jar	11/2014
SwitchBlade x8106 SwitchBlade x8112	SBx8100	SBx81CFC400-5.4.4-3.5.rel SBx81CFC960-5.4.4-3.5.rel	SBx81CFC400_gui_544_09.jar Not applicable	11/2014



Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.

New Features and Enhancements

Software version 5.4.4-3.5 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-1.1.

This section summarizes the new features in 5.4.4-3.5. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Enhancements to Processing of Next Hop Updates

On SBx8100, SBx908 and x900 series switches, next hop updates are now processed more efficiently. If your network is designed so that a very large number of routes have the same next hop, this may improve the responsiveness of time-sensitive protocols such as EPSR and STP.

Login Security Enhancements

This software version includes several enhancements to the switch's login security settings.

As indicated below, some of these enhancements are only available when the switch is "locked down" at security level 3. This security level is a bootloader security setting. To set it, type Ctrl-B during boot-up to enter the bootloader, then type "s" at the bootloader menu.

The bootloader security settings are available on SBx8100, SBx908, x900, x610, x310 and x230 Series switches.

"Last login" message

At login, the switch now displays:

- a "Last login" message, indicating when that user last logged in, and
- if the switch's bootloader is set to security level 3, a "Failed login" message if there have been any failed login attempts for that user.

These messages are displayed for logins via the console, Telnet or SSH.

The console output looks like this:

```
x510-D login: aa
Password:
Last login: Mon Oct 13 14:07:32 NZST 2014 on ttyS0
Last failed login: Mon Oct 13 15:21:07 NZST 2014 on ttyS0
There were 2 failed login attempts since the last successful
login.

AlliedWare Plus (TM) 5.4.4 10/13/14 12:59:36
```

Logging of attempts to set release files

When a user attempts to set a primary or backup release file (using the **boot system** command), the switch now sends a failure or success message to the logging system. The error message has a log severity level of “warning” and the success message has a severity level of “notice”.

Delay between password attempts

On a switch whose bootloader is set to security level 3, a 4 second gap is now required between attempts to re-enter a password. This applies for console, Telnet and SSH logins, and for both local and RADIUS users.

Configurable number of login attempts by SSH

You can now specify the maximum number of SSH authentication attempts that the switch will allow. The default is 6 attempts. To change this, use the new command:

```
awplus(config)#ssh server max-auth-tries <1-32>
```

VRRPv3 Secondary IPv6 Address

VRRPv3 now allows users to specify a secondary IPv6 address on an IPv6 VRRP instance. This enables you to specify a globally-routable address as the default gateway address for all the hosts on a VLAN.

To do this, use the new **secondary** parameter in the following command:

Syntax

```
virtual-ipv6 <ipv6-address> [master|backup] [primary|secondary]
no virtual-ipv6
```

Parameter	Description
<ipv6-address>	The IPv6 address of the virtual router, entered in hexadecimal, in the format X:X::X:X. This is an IPv6 link-local address.
master	Sets the default state of the VRRPv3 router within the Virtual Router as master . For master , the router must own the Virtual IP address.
backup	Sets the default state of the VRRPv3 router within the Virtual Router as backup .
primary	Sets the specified address as the primary IPv6 address. The primary address must be a link-local IPv6 address.
secondary	Sets the specified address as the secondary IPv6 address. Normally this would be a globally-routable IPv6 address.

Mode Router Configuration

Web Authentication Unmatched Proxy Setting Detection

By default, AlliedWare Plus Web Authentication intercepts the supplicant's initial TCP port 80 connection to a web page and sends it the Web Authentication login page. You can also specify any additional TCP port numbers that the web authentication server is to intercept by using the **auth-web-server intercept-port** command. In this way, Web Authentication can intercept packets going to a proxy server by adding the port number of the proxy server.

However, when the web authentication switch is in a guest network, the switch does not know the proxy server's port number in the supplicant's proxy setting. To overcome this limitation, you can now use the new **any** option in the **auth-web-server intercept-port** command to intercept all TCP packets:

```
awplus(config)#auth-web-server intercept-port any
```

Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases need to be licensed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:

- [“Licensing this Software Version on an SBx908 Switch” on page 9](#) and
- [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 11.](#)

Upgrading a VCStack

This software version supports VCStack “reboot rolling” upgrades. With the **reboot rolling** command, you can reduce downtime when upgrading a VCStack.

You can use the **reboot rolling** command to upgrade to 5.4.4-3.5 from any 5.4.4-1.x version. The following table shows the process for using it to update from earlier versions.

Upgrading from	How to upgrade using the reboot rolling command
5.4.4-0.x	First upgrade to 5.4.4-1.x, then to 5.4.4-2.x.
5.4.3-x.x	First upgrade to any 5.4.4-0.x version, then to 5.4.4-1.x, then to 5.4.4-2.x.

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

If the existing VCStack is running ...	then a new member can join the VCStack if it is running ...
any 5.4.4-0.x version	any 5.4.4-0.x version
5.4.4-1.1 or 5.4.4-1.2	5.4.4-1.1 or 5.4.4-1.2
5.4.4-2.3 or 5.4.4-2.4	5.4.4-2.3 or 5.4.4-2.4
5.4.4-3.5	5.4.4-2.3, 5.4.4-2.4 or 5.4.4-3.5

Before you add a new switch to a stack, make sure the new switch’s version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.

ISSU (In-Service Software Upgrade)

This version does not support ISSU: You cannot use ISSU to upgrade to this minor software version.

AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with:

- x210 Series switches running version 5.4.4-1.2 (but not earlier versions)
- other AlliedWare Plus switches running version 5.4.3-2.6 and later or any 5.4.4-x.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

For x210 Series switches, you can use these methods to upgrade to this version from 5.4.4-1.2, but not from earlier versions.

For other switches, you can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-x.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).
2. Decide which AMF upgrade method is most suitable.
3. Initiate the AMF network upgrade using the selected method. To do this:
 - a. create a working-set of the switches you want to upgrade
 - b. enter the command **atmf reboot-rolling <location>** or **atmf distribute-firmware <location>** where **<location>** is the location of the .rel files.
 - c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.

Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- **Obtain the MAC address for a switch**
- **Obtain a release license for a switch**
- **Apply a release license on a switch**
- **Confirm release license application**

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the **show system mac license** command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the **license certificate** command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands **show license** or **show license brief** to confirm release license application.

On a stacked switch, use the command **show license member** or **show license brief member** to confirm release license application.

From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Features included : EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64,
                  RADIUS-100, RIP, VRRP

Index          : 2
License name    : 5.4.4-r1
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Release        : 5.4.4
```

Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- **Obtain the MAC address for a control card**
- **Obtain a release license for a control card**
- **Apply a release license on a control card**
- **Confirm release license application**

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the **license certificate** command on the stack master will automatically apply the release licenses to all the control cards within the stack.

Step 1: Obtain the MAC address for a control card

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the **show system mac license** command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:

Card          MAC Address
-----
1.5           eccd.6d9e.3312
1.6           eccd.6db3.58e7

Chassis MAC Address eccd.6d7b.3bc2
```

Step 2: Obtain a release license for a control card

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a control card

Use the **license certificate** command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license

1 license installed.
```

Step 4: Confirm release license application

On a stand-alone chassis, use the commands **show license** or **show license brief** to confirm release license application.

On a stacked chassis, use the command **show license member** or **show license brief member** to confirm release license application.

From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
-----
Index                : 1
License name         : Base License
Customer name        : ABC Consulting
Quantity of licenses : 1
Type of license      : Full
License issue date   : 10-Jul-2014
License expiry date  : N/A
Features included    : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100
                     : Virtual-MAC, VRRP

Index                : 2
License name         : 5.4.4-rl
Customer name        : ABC Consulting
Quantity of licenses : -
Type of license      : Full
License issue date   : 10-Jul-2014
License expiry date  : N/A
Release              : 5.4.4
```

Installing this Software Version



Caution: Software version 5.4.4-2.3 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see [“Licensing this Software Version on an SBx908 Switch” on page 9](#) and [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 11](#).

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.
2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.

```
awplus# copy tftp flash
```

Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:

```
awplus# configure terminal
```

Then set the switch to reboot with the new software version:

Switch	Command
x210 Series	<code>awplus(config)# boot system x210-5.4.4-3.5.rel</code>
x230 Series	<code>awplus(config)# boot system x230-5.4.4-3.5.rel</code>
x310 Series	<code>awplus(config)# boot system x310-5.4.4-3.5.rel</code>
IX5-28GPX	<code>awplus(config)# boot system IX5-5.4.4-3.5.rel</code>
x510 Series	<code>awplus (config)# boot system x510-5.4.4-3.5.rel</code>
x610 Series	<code>awplus(config)# boot system x610-5.4.4-3.5.rel</code>
x900 Series	<code>awplus(config)# boot system x900-5.4.4-3.5.rel</code>
SBx908	<code>awplus(config)# boot system SBx908-5.4.4-3.5.rel</code>
SBx8100 with CFC400	<code>awplus(config)# boot system SBx81CFC400-5.4.4-3.5.rel</code>
SBx8100 with CFC960	<code>awplus(config)# boot system SBx81CFC960-5.4.4-3.5.rel</code>

Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus(config)# exit
```

```
awplus# show boot
```

5. Reboot using the new software version.

```
awplus# reload
```

Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (**.jar**) gives the earliest version of the software file (**.rel**) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- PC Platform:
Windows XP SP2 and up / Windows Vista SP1 and up
- Browser: (must support Java Runtime Environment (JRE) version 6)
Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (**.jar** extension) onto your TFTP server, SD card or USB storage device.
2. Connect to the switch's management port, then log into the switch.
3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.

To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# interface vlan1
```

```
awplus(config-if)#ip address <address>/<prefix-length>
```

Where *<address>* is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:

```
awplus(config-if)# ip address 192.168.2.6/24
```

5. If required, **configure a default gateway for the switch.**

```
awplus(config-if)# exit
```

```
awplus(config)# ip route 0.0.0.0/0 <gateway-address>
```

Where *<gateway-address>* is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.

6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.

TFTP server: Use the command:

```
awplus# copy tftp://<server-address>/<filename.jar> flash:/
```

SD card: use the command:

```
awplus# copy card:/<filename.jar> flash:/
```

USB storage device: use the command:

```
awplus# copy usb:/<filename.jar> flash:/
```

where <server-address> is the IP address of the TFTP server, and where <filename.jar> is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# service http
```

The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.

```
awplus(config)# username <username> privilege 15 password  
                  <password>
```

You can create multiple users to log into the GUI. For information about the **username** command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser

On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.

Next, click on the 'Security' tab. Ensure the 'Enable Java content in the browser' checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List

Click on the 'Edit Site List' button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the 'Exception Site List' dialog, enter the IP address you configured in Step 4, with a http:// prefix.

After entering the URL click the Add button then click OK.

11. Log into the GUI.

Start a browser and enter the switch's IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.

AlliedWare Plus Version 5.4.4-2.3

For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, x310 Series, x230 Series and x210 Series Switches

Contents

Introduction	18
Key New Features and Enhancements	20
Web-Authentication Enhancements	20
Stack-Local-VLANs Enhancements	22
Important Considerations Before Upgrading to this Version	24
Licensing	24
Upgrading a VCStack	24
Forming or extending a VCStack	24
ISSU (In-Service Software Upgrade)	25
AMF software version compatibility	25
Upgrading all switches in an AMF network	25
Licensing this Software Version on an SBx908 Switch	26
Licensing this Software Version on a Control Card for an SBx8100 Series Switch	28
Installing this Software Version	30
Installing the GUI	32

Introduction

This release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-2.3 since version 5.4.4-1.1. For more information, see the Software Reference for your switch. Software file details for this version are listed in [Table 1](#) below.



Caution: Software version 5.4.4-2.3 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- [“Licensing this Software Version on an SBx908 Switch” on page 26](#) and
- [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 28.](#)

Table 1: Switch models and software file names

Models	Series	Software File	GUI File	Date
x210-9GT x210-16GT x210-24GT	x210	x210-5.4.4-2.3.rel	x210-gui_544_06.jar	10/2014
x230-10GP x230-18GP	x230	x230-5.4.4-2.3.rel	x230-gui_544_02.jar	10/2014
x310-26FT x310-50FT x310-26FP x310-50FP	x310	x310-5.4.4-2.3.rel	x310-gui_544_02.jar	10/2014
IX5-28GPX	IX5	IX5-5.4.4-2.3.rel	IX5-gui_544_07.jar	10/2014
x510-28GTX x510-52GTX x510-28GPX x510-52GPX x510-28GSX x510DP-52GTX	x510	x510-5.4.4-2.3.rel	x510-gui_544_07.jar	10/2014
x610-24Ts x610-24Ts-PoE+ x610-24Ts/X x610-24Ts/X-PoE+ x610-24SPs/X x610-48Ts x610-48Ts-PoE+ x610-48Ts/X x610-48Ts/X-PoE+	x610	x610-5.4.4-2.3.rel	x610-gui_544_07.jar	10/2014
x900-12XT/S x900-24XS x900-24XT	x900	x900-5.4.4-2.3.rel	x900-gui_544_07.jar	10/2014
SwitchBlade x908	SBx908	SBx908-5.4.4-2.3.rel	x900-gui_544_07.jar	10/2014
SwitchBlade x8106 SwitchBlade x8112	SBx8100	SBx81CFC400-5.4.4-2.3.rel SBx81CFC960-5.4.4-2.3.rel	SBx81CFC400_gui_544_07.jar Not applicable	10/2014



Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.

Key New Features and Enhancements

Software version 5.4.4-2.3 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-1.1.

This section summarizes the key new features. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Web-Authentication Enhancements

The following enhancements have been added to web-authentication.

- Custom login page
- External login page
- Robust web-authentication

Custom login page You can customize the web-authentication page by changing the web page logo image, success message, welcome message, and web page title.

The following commands have been introduced for this enhancement.

- **auth-web-server page logo**
- **auth-web-server page sub-title**
- **auth-web-server page success-message**
- **auth-web-server page title**
- **auth-web-server page welcome-message**
- **show auth-web-server page**

External login page You can use an external login page for web-authentication rather than using the built-in AlliedWare Plus login page.

The **auth-web forward** command has been introduced for this enhancement.

Robust web-authentication Web-authentication configuration has been simplified and some limitations have been removed. For command details, see **Authentication Commands** in this release note.

- Previously, you could configure an intercept mode on the web-authentication server for supplicants (client devices). Now, you no longer need to configure the intercept mode. Intercept mode is always available and it intercepts HTTP packets but doesn't intercept ARP or DNS messages. As a result, the **auth-web-server mode** command has been deleted.
- Previously, you could enable the HTTP redirect feature on every interface on which web-based port authentication was enabled. Now, the HTTP redirect feature is always enabled and you cannot disable it. As a result, the **auth-web-server http-redirect** command has been deleted.
- Previously, you needed to register the gateway information when the supplicant was authorized. Now, the AlliedWare Plus device acts as the default gateway and you no longer need to add the gateway information. As a result, the **auth-web-server gateway** command has been deleted.

- Previously, you could set the HTTPS port number for the web authentication server. Now, you no longer need to set the port number and the default port number 443 is used. As a result, the **auth-web-server sslport** command has been deleted.
- The default behavior of web-authentication packet forwarding has changed. Previously, packet forwarding for port authentication was disabled by default. Now, ARP, DHCP, DNS forwarding for port authentication are enabled by default. TCP and UDP forwarding for port authentication are disabled by default. As a result, the default behavior of the **auth-web forward** command has been changed.
- Previously, you could use either HTTP protocol or HTTPS protocol for the web authentication server. Both HTTP and HTTPS packets were redirected to HTTP server or HTTPS server. Now, you can use both HTTP protocol and HTTPS protocol. When both protocols are used, HTTP packet is redirected to HTTP server and HTTPS packet is redirected to HTTPS server respectively. As a result, the **auth-web-server ssl** command has been changed and you can use the **hybrid** option of this command to enable both HTTP and HTTPS for the web authentication server.
- Previously, you could register only HTTP intercept port numbers. Now, you can use the **auth-web-server ssl intercept-port** new command to register HTTPS intercept port numbers when the HTTPS server uses custom port numbers.
- Previously, you couldn't assign a hostname to the web authentication server. Now, you can use the **auth-web-server host-name** new command to assign a hostname to the web authentication server.
- As a result of the enhancements, the output of the **show auth-web-server** command has been changed.
- If you configure a virtual IP address for the web-authentication server by using the **auth-web-server ipaddress** command or the **auth-web-server dhcp ipaddress** command, you must add a hardware ACL which sends the packets going to the virtual IP address to the CPU on the web-authentication enabled interfaces. If the hardware ACL is not set, the web-authentication success page will not appear on the supplicant's web browser. For example, if you configure the virtual IP address 1.2.3.4 and web-authentication is enabled on port1.0.1 and port1.0.7, you must add the hardware filter **send-to-cpu ip any 1.2.3.4/32** to port1.0.1 and port1.0.7 as shown in the following **show running-config** command output:

```
...
auth-web-server ipaddress 1.2.3.4

access-list hardware acl-web
send-to-cpu ip any 1.2.3.4/32
!
interface port1.0.1
auth-web enable
access-group acl-web
!
interface port1.0.7
auth-web enable
access-group acl-web
!
```

Stack-Local-VLANs Enhancements

Network data VLANs are shared by the stack and use the stack's virtual MAC address. Consequently only the stack master is able to respond to messages such as ARP or ICMP requests. One disadvantage of this is that although network administrators can ping the whole stack to determine its operational status, such ping will not provide status information for individual stack members. Stack-local-VLANs provide a solution to this problem. For command details, see [vlan mode stack-local-vlan](#) in this release note.

Note This enhancement exists only on the following stackable switches: x310, x510, and x610 Series.



Stack-Local-VLAN Operation

Each stack-local-VLAN belongs to a specific stack member, and uses that stack member's physical MAC address, rather than the stack's virtual MAC address. This enables a stack member to process stack-local-VLAN traffic directly on its own CPU, even if this is the stack master.

This strict association of local VLAN, to specific stack member enables network administrators to ping each stack member individually in order to monitor the health of the entire stack, on a member-by-member basis.

Stack-local-VLANs are especially useful within networks where ping polling is used to monitor the health of network devices.

Stack-Local-VLAN Configuration

The following example shows a stack-local-VLAN configuration for a two member stack. Note that overlapping IP subnets are permitted on local VLAN interfaces:

Table 1-1: Configuring Stack-Local-VLANs on a Two Member Stack

Description	Prompt	Command
Step 1. Create the stack-local-VLANs for stack members 1 and 2		
Enter global configuration mode.	awplus#	configure terminal
Enter VLAN database mode.	awplus(config)#	vlan database
Create the stack-local-VLAN for stack member 1.	awplus(config-vlan)#	vlan 4001 mode stack-local-vlan 1
Create the stack-local-VLAN for stack member 2.	awplus(config-vlan)#	vlan 4001 mode stack-local-vlan 2
Step 2. Apply the access port mode to port 1.0.24		
Enter global configuration mode.	awplus#	configure terminal
Enter interface configuration mode for port 1.0.24.	awplus(config)#	interface port1.0.24
Set the port to access mode.	awplus(config-if)#	switchport mode access
Add this port to member 1's local VLAN.	awplus(config-if)#	switchport access vlan 4001
Step 3. Apply the access port mode to port 2.0.24		

Table 1-1: Configuring Stack-Local-VLANs on a Two Member Stack

Description (cont.)	Prompt (cont.)	Command (cont.)
Enter interface configuration mode for port 2.0.24.	awplus(config)#	interface port2.0.24
Set the port to access mode.	awplus(config-if)#	switchport mode access
Add this port to member 2's local VLAN.	awplus(config-if)#	switchport access vlan 4002
Step 4. Apply the IP address 192.168.1.1/24 to VLAN 4001		
Enter global configuration mode.	awplus#	configure terminal
Select local VLAN interface for member 1	awplus(config)#	interface vlan4001
Assign an IP address that member 1 will reply to.	awplus(config-if)#	ip address 192.168.1.1/24
Step 5. Apply the IP address 192.168.1.2/24 to VLAN 4002		
Enter global configuration mode.	awplus#	configure terminal
Select local VLAN interface for member 2	awplus(config)#	interface vlan4002
Assign an IP address that member 2 will reply to.	awplus(config-if)#	ip address 192.168.1.2/24

Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases need to be licensed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:

- **“Licensing this Software Version on an SBx908 Switch” on page 26** and
- **“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 28.**

Upgrading a VCStack

This software version supports VCStack “reboot rolling” upgrades. With the **reboot rolling** command, you can reduce downtime when upgrading a VCStack.

You can use the **reboot rolling** command to upgrade to 5.4.4-2.3 from any 5.4.4-1.x version. The following table shows the process for using it to update from earlier versions.

Upgrading from	How to upgrade using the reboot rolling command
5.4.4-0.x	First upgrade to 5.4.4-1.x, then to 5.4.4-2.x.
5.4.3-x.x	First upgrade to any 5.4.4-0.x version, then to 5.4.4-1.x, then to 5.4.4-2.x.

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

If the existing VCStack is running ...	then a new member can join the VCStack if it is running ...
any 5.4.4-0.x version	any 5.4.4-0.x version
5.4.4-1.1 or 5.4.4-1.2	5.4.4-1.1 or 5.4.4-1.2
5.4.4-2.3 or 5.4.4-2.4	5.4.4-2.3 or 5.4.4-2.4

Before you add a new switch to a stack, make sure the new switch’s version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.

ISSU (In-Service Software Upgrade)

This version does not support ISSU: You cannot use ISSU to upgrade to this minor software version.

AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with:

- x210 Series switches running version 5.4.4-1.2 (but not earlier versions)
- other AlliedWare Plus switches running version 5.4.3-2.6 and later or any 5.4.4-x.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

For x210 Series switches, you can use these methods to upgrade to this version from 5.4.4-1.2, but not from earlier versions.

For other switches, you can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-x.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).
2. Decide which AMF upgrade method is most suitable.
3. Initiate the AMF network upgrade using the selected method. To do this:
 - a. create a working-set of the switches you want to upgrade
 - b. enter the command **atmf reboot-rolling <location>** or **atmf distribute-firmware <location>** where **<location>** is the location of the .rel files.
 - c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.

Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the **show system mac license** command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the **license certificate** command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands **show license** or **show license brief** to confirm release license application.

On a stacked switch, use the command **show license member** or **show license brief member** to confirm release license application.

From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Features included : EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64,
                  RADIUS-100, RIP, VRRP

Index          : 2
License name    : 5.4.4-r1
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Release        : 5.4.4
```

Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- **Obtain the MAC address for a control card**
- **Obtain a release license for a control card**
- **Apply a release license on a control card**
- **Confirm release license application**

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the **license certificate** command on the stack master will automatically apply the release licenses to all the control cards within the stack.

Step 1: Obtain the MAC address for a control card

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the **show system mac license** command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:

Card                MAC Address
-----
1.5                 eccd.6d9e.3312
1.6                 eccd.6db3.58e7

Chassis MAC Address eccd.6d7b.3bc2
```

Step 2: Obtain a release license for a control card

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a control card

Use the **license certificate** command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license

1 license installed.
```

Step 4: Confirm release license application

On a stand-alone chassis, use the commands **show license** or **show license brief** to confirm release license application.

On a stacked chassis, use the command **show license member** or **show license brief member** to confirm release license application.

From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Features included : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100
                  Virtual-MAC, VRRP

Index          : 2
License name    : 5.4.4-rl
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Release        : 5.4.4
```

Installing this Software Version



Caution: Software version 5.4.4-2.3 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see [“Licensing this Software Version on an SBx908 Switch” on page 26](#) and [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 28](#).

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.
2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.

```
awplus# copy tftp flash
```

Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:

```
awplus# configure terminal
```

Then set the switch to reboot with the new software version:

Switch	Command
x210 Series	<code>awplus(config)# boot system x210-5.4.4-2.3.rel</code>
x230 Series	<code>awplus(config)# boot system x230-5.4.4-2.3.rel</code>
x310 Series	<code>awplus(config)# boot system x310-5.4.4-2.3.rel</code>
IX5-28GPX	<code>awplus(config)# boot system IX5-5.4.4-2.3.rel</code>
x510 Series	<code>awplus (config)# boot system x510-5.4.4-2.3.rel</code>
x610 Series	<code>awplus(config)# boot system x610-5.4.4-2.3.rel</code>
x900 Series	<code>awplus(config)# boot system x900-5.4.4-2.3.rel</code>
SBx908	<code>awplus(config)# boot system SBx908-5.4.4-2.3.rel</code>
SBx8100 with CFC400	<code>awplus(config)# boot system SBx81CFC400-5.4.4-2.3.rel</code>
SBx8100 with CFC960	<code>awplus(config)# boot system SBx81CFC960-5.4.4-2.3.rel</code>

Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus(config)# exit
```

```
awplus# show boot
```

5. Reboot using the new software version.

```
awplus# reload
```

Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (**.jar**) gives the earliest version of the software file (**.rel**) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- PC Platform:
Windows XP SP2 and up / Windows Vista SP1 and up
- Browser: (must support Java Runtime Environment (JRE) version 6)
Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (**.jar** extension) onto your TFTP server, SD card or USB storage device.
2. Connect to the switch's management port, then log into the switch.
3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.

To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# interface vlan1
```

```
awplus(config-if)#ip address <address>/<prefix-length>
```

Where *<address>* is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:

```
awplus(config-if)# ip address 192.168.2.6/24
```

5. If required, **configure a default gateway for the switch.**

```
awplus(config-if)# exit
```

```
awplus(config)# ip route 0.0.0.0/0 <gateway-address>
```

Where *<gateway-address>* is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.

6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.

TFTP server: Use the command:

```
awplus# copy tftp://<server-address>/<filename.jar> flash:/
```

SD card: use the command:

```
awplus# copy card:/<filename.jar> flash:/
```

USB storage device: use the command:

```
awplus# copy usb:/<filename.jar> flash:/
```

where <server-address> is the IP address of the TFTP server, and where <filename.jar> is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# service http
```

The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.

```
awplus(config)# username <username> privilege 15 password  
                  <password>
```

You can create multiple users to log into the GUI. For information about the **username** command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser

On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.

Next, click on the 'Security' tab. Ensure the 'Enable Java content in the browser' checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List

Click on the 'Edit Site List' button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the 'Exception Site List' dialog, enter the IP address you configured in Step 4, with a http:// prefix.

After entering the URL click the Add button then click OK.

11. Log into the GUI.

Start a browser and enter the switch's IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.

Authentication Commands

Contents

auth-web forward	36
auth-web-server host-name	38
auth-web-server login-url	39
auth-web-server page logo	40
auth-web-server page sub-title	41
auth-web-server page success-message	42
auth-web-server page title	43
auth-web-server page welcome-message	44
auth-web-server ssl	45
auth-web-server ssl intercept-port	46
show auth-web-server	47
show auth-web-server page	48

auth-web forward

This command enables the web authentication packet forwarding feature on the interface specified. This command also enables ARP forwarding, and adds forwarded packets to the TCP or UDP port number specified.

Use the **no** variant of this command disables or deletes the packet forwarding feature on the interface.

Syntax

```
auth-web forward {arp|dhcp}
no auth-web forward {arp|dhcp}
auth-web forward [<ip-address>] {dns|tcp <1-65535>|udp <1-65535>}
no auth-web forward <ip-address> {dns|tcp <1-65535>|udp <1-65535>}
```

Parameter	Description
<ip-address>	Enable forwarding to the destination IPv4 address.
arp	Enable forwarding of ARP.
dhcp	Enable forwarding of DHCP (UDP port 67).
dns	Enable forwarding of DNS (UDP port 53).
tcp	Enable forwarding of TCP specified port number.
<1-65535>	TCP Port number.
udp	Enable forwarding of UDP specified port number.
<1-65535>	UDP Port number.

Default ARP, DHCP and DNS forwarding for port authentication are enabled by default. TCP and UDP forwarding for port authentication are disabled by default.

Mode Interface Configuration for a static channel, a dynamic (LACP) channel group, or a switch port.

Examples To enable the ARP forwarding feature on interface port1.0.2, use the following commands:

```
awplus# configure terminal
awplus(config)# interface port1.0.2
awplus(config-if)# auth-web forward arp
```

To enable the ARP forwarding feature on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# auth-web forward arp
```

To add the TCP forwarding port 137 on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# auth-web forward tcp 137
```

To disable the ARP forwarding feature on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# no auth-web forward arp
```

To delete the TCP forwarding port 137 on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# no auth-web forward tcp 137
```

To delete all of TCP forwarding on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# no auth-web forward tcp
```

Related Commands **show auth-web**
 show auth-web interface
 show running-config

auth-web-server host-name

This command assigns a hostname to the web authentication server.

Use the **no** variant of this command to remove the hostname from the web authentication server.

Syntax `auth-web-server host-name <hostname>`

`no auth-web-server host-name`

Parameter	Description
<code><hostname></code>	URL string of the hostname

Default The web authentication server has no hostname.

Mode Global Configuration

Usage When the web authentication server uses HTTPS protocol, the web browser will validate the certificate. If the certificate is invalid, the web page gives a warning message before displaying server content. However, the web page will not give warning message if the server has a hostname same as the one stored in the installed certificate.

Examples To set the auth.example.com as the hostname of the web authentication server, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server host-name auth.example.com
```

To remove hostname auth.example.com from the web authentication server, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server host-name
```

Related Commands `aaa authentication auth-web`
`auth-web enable`

auth-web-server login-url

This command sets the web-authentication login page URL.

Use the **no** variant of this command to delete the set URL.

Syntax `auth-web-server login-url <URL>`
`no auth-web-server login-url`

Parameter	Description
<URL>	Set login page URL

Default The built-in login page is set by default.

Mode Global Configuration

Examples To set `http://example.com/login.html` as the login page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server login-url http://
example.com/login.html
```

To unset the login page URL, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server login-url
```

**Validation
Commands** `show running-config`

auth-web-server page logo

This command sets the type of logo that will be displayed on the web authentication page.

Use the **no** variant of this command to set the logo type to **auto**.

Syntax `auth-web-server page logo {auto|default|hidden}`

`no auth-web-server page logo`

Parameter	Description
auto	Display the custom logo if installed; otherwise display the default logo
default	Display the default logo
hidden	Hide the logo

Default Logo type is **auto** by default.

Mode Global Configuration

Examples To display the default logo with ignoring installed custom logo, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page logo default
```

To set back to the default logo type **auto**, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page logo
```

Validation Commands **show auth-web-server page**

auth-web-server page sub-title

This command sets the custom sub-title on the web authentication page.

Use the **no** variant of this command to reset the sub-title to its default.

Syntax `auth-web-server page sub-title {hidden|text <sub-title>}`
`no auth-web-server page sub-title`

Parameter	Description
hidden	Hide the sub-title
<sub-title>	Text string of the sub-title

Default "Allied-Telesis" is displayed by default.

Mode Global Configuration

Examples To set the custom sub-title, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page sub-title text Web
Authentication
```

To hide the sub-title, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page sub-title hidden
```

To change back to the default title, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page sub-title
```

**Validation
Commands** **show auth-web-server page**

auth-web-server page success-message

This command sets the success message on the web-authentication page.

Use the **no** variant of this command to remove the success message.

Syntax `auth-web-server page success-message text <success-message>`
`no auth-web-server page success-message`

Parameter	Description
<code><success-message></code>	Text string of the success message

Default No success message is set by default.

Mode Global Configuration

Examples To set the success message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page success-message text
Your success message
```

To unset the success message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page success-message
```

Validation Commands `show auth-web-server page`

auth-web-server page title

This command sets the custom title on the web authentication page.

Use the **no** variant of this command to remove the custom title.

Syntax `auth-web-server page title {hidden|text <title>}`
`no auth-web-server page title`

Parameter	Description
hidden	Hide the title
<title>	Text string of the title

Default "Web Access Authentication Gateway" is displayed by default.

Mode Global Configuration

Examples To set the custom title on the web authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page title text Login
```

To hide the title on the web authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page title hidden
```

To unset the custom title on the web authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page title
```

**Validation
Commands** `show auth-web-server page`

auth-web-server page welcome-message

This command sets the welcome message on the web-authentication page.

Use the **no** variant of this command to remove the welcome message.

Syntax `auth-web-server page welcome-message text <welcome-message>`
`no auth-web-server page welcome-message`

Parameter	Description
<code><welcome-message></code>	Text string of the welcome message

Default No welcome message is set by default.

Mode Global Configuration

Examples To set the welcome message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page welcome-message text
Your welcome message
```

To remove the welcome message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page welcome-message
```

Validation Commands `show auth-web-server page`

auth-web-server ssl

This command enables HTTPS protocol or both HTTP protocol and HTTPS protocol for the web authentication server feature.

When both protocols are enabled, HTTP packet is redirected to HTTP server and HTTPS packet is redirected to HTTPS server respectively.

Use the **no** variant of this command to disable HTTPS protocol.

Syntax `auth-web-server ssl [hybrid]`

`no auth-web-server ssl`

Parameter	Description
hybrid	Enable both HTTP protocol and HTTPS protocol

Default HTTP protocol is enabled by default.

Mode Global Configuration

Examples To enable HTTPS functionality for the web authentication server feature, use the following commands:

```
awplus# configure terminal
awplus(config)# auth-web-server ssl
```

To enable both HTTP protocol and HTTPS protocol, use the following commands:

```
awplus# configure terminal
awplus(config)# auth-web-server hybrid
```

To disable HTTPS functionality for the web authentication server feature, use the following commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server ssl
```

Validation `show auth-web`
Commands `show auth-web-server`

auth-web-server ssl intercept-port

Use this command to register HTTPS intercept port numbers when the HTTPS server uses custom port number (not TCP port number 443).

Note that you need to use the **auth-web-server intercept-port** command to register HTTP intercept port numbers.

Use the **no** variant of this command to delete registered port number.

Syntax `auth-web-server ssl intercept-port <1-65535>`
`no auth-web-server ssl intercept-port <1-65535>`

Parameter	Description
<1-65535>	TCP port number in the range from 1 through 65535

Default 443/TCP is registered by default.

Mode Global Configuration

Examples To register HTTPS port number 3128, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server ssl intercept-port 3128
```

To delete HTTPS port number 3128, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server ssl intercept-port 3128
```

**Validation
Commands** **show auth-web-server**

Related Commands **auth-web-server intercept-port**

show auth-web-server

This command shows the web authentication server configuration and status on the switch.

Syntax show auth-web-server

Mode Privileged Exec

Examples To display web authentication server configuration and status, use the command:

```
awplus# show auth-web-server
```

Figure 1: Example output from the show auth-web-server command on the console.

```
awplus#show auth-web-server
Web authentication server
  Server status: enabled
  Server address: --
  Server Host-Name: --
  Server protocol: HTTP
  DHCP server: disabled
  DHCP lease time: 20
  DHCP WPAD option URL: --
  HTTP Port No: --
  Certification: default
  HTTP Intercept Port No: 80
  HTTPS Intercept Port No: 443
  Redirect URL: --
  Redirect delay time: 5
  Session keep: disabled
  Login URL: --
  PingPolling: disabled
  PingInterval: 30
  Timeout: 1
  FailCount: 5
  ReauthTimerRefresh: disabled
awplus#
```

Related Commands

- [auth-web forward](#)
- [auth-web-server ipaddress](#)
- [auth-web-server port](#)
- [auth-web-server redirect-delay-time](#)
- [auth-web-server redirect-url](#)
- [auth-web-server session-keep](#)
- [auth-web-server ssl](#)
- [auth-web-server ssl intercept-port](#)

show auth-web-server page

This command displays the web-authentication page configuration and status.

Syntax show auth-web-server page

Mode Privileged Exec

Examples To show the web-authentication page information, use the command:

```
awplus# show auth-web-server page
```

Figure 2: Example output from the show auth-web-server page command on the console.

```
awplus#show auth-web-server page
Web authentication page
  Logo: auto
  Title: default
  Sub-Title: Web Authentication
  Welcome message: Your welcome message
  Success message: Your success message
```

Related Commands

- [auth-web forward](#)
- [auth-web-server page logo](#)
- [auth-web-server page sub-title](#)
- [auth-web-server page success-message](#)
- [auth-web-server page title](#)
- [auth-web-server page welcome-message](#)

Stack-Local-VLANs Commands

Contents

vlan mode stack-local-vlan	50
----------------------------------	----

vlan mode stack-local-vlan

This command enables you to create stack-local-VLANs and use ICMP to monitor and diagnose issues within specific members of the stack. When a VLAN is added using this method, all its traffic will be trapped to and processed by the CPU of the specific local stack member, rather than the CPU of the stack master.

The **no** variant of this command destroys the specified VLAN.

Syntax `vlan <vid> mode stack-local-vlan <member-id>`
`no vlan <vid>`

Parameter	Description
<vid>	The VID of the VLAN to be created in the range 2-4094. We recommend that the first stack-local-vlan be assigned the number 4001 for the first stack member, then incremented by one for each stack member. So a stack of four members would be assigned the following VID numbers: stack member one VID 4001 stack member two VID 4002 stack member three VID 4003 stack member four VID 4004
mode stack-local-vlan	Specifies that the new VLAN will function as a stack-local-VLAN.
<member-id>	Specifies the new stack member ID. Enter a decimal number in the range 1-8.

Default By default, VLANs are automatically enabled as they are added.

Mode VLAN Configuration

Examples To add a stack-local-VLAN with the VID of 4002 and assign it to stack member 2, use the following commands:

```
awplus# configure terminal
awplus(config)# vlan database
awplus(config-vlan)# vlan 4002 mode stack-local-vlan 2
```

To remove VLAN 4002, use the following commands:

```
awplus# configure terminal
awplus(config)# vlan database
awplus(config-vlan)# no vlan 4002
```

Related Commands `mtu`
`vlan database`
`show vlan`

AlliedWare Plus Version 5.4.4-1.1

For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, x310 Series, x230 Series, and x210 Series Switches

Contents

Introduction	52
New Products in 5.4.4-1.1	54
x230 Series Enterprise PoE+ Gigabit Edge Switches	54
x310 Series Stackable Access Switches	54
SBx81XS16 Line Card for SBx8100 Series	55
Key New Features and Enhancements	56
Cable Fault Locator	56
In-Service Software Upgrade (ISSU)	56
AMF Enhancements	56
Release Licensing	57
Important Considerations Before Upgrading to this Version	58
Licensing	58
Upgrading a VCStack	58
Forming or extending a VCStack	58
ISSU (In-Service Software Upgrade)	58
AMF software version compatibility	59
Upgrading all switches in an AMF network	59
Changes in this Version	60
Licensing this Software Version on an SBx908 Switch	67
Licensing this Software Version on a Control Card for an SBx8100 Series Switch	69
Installing this Software Version	71
Installing the GUI	73

Introduction

This release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-1.1 since version 5.4.4-0.1. For more information, see the Software Reference for your switch. Software file details for this version are listed in [Table 1](#) below.



Caution: Software version 5.4.4-1.1 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- [“Licensing this Software Version on an SBx908 Switch” on page 67](#) and
- [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 69.](#)

Table 1: Switch models and software file names

Models	Series	Software File	GUI File	Date
x210-9GT x210-16GT x210-24GT	x210	x210-5.4.4-1.1.rel	x210-gui_544_06.jar	07/2014
x230-10GP x230-18GP	x230	x230-5.4.4-1.1	Not applicable	07/2014
x310-26FT x310-50FT x310-26FP x310-50FP	x310	x310-5.4.4-1.1.rel	x310-gui_544_02.jar	07/2014
IX5-28GPX	IX5	IX5-5.4.4-1.1.rel	IX5-gui_544_07.jar	07/2014
x510-28GTX x510-52GTX x510-28GPX x510-52GPX x510-28GSX x510DP-52GTX	x510	x510-5.4.4-1.1.rel	x510-gui_544_07.jar	07/2014
x610-24Ts x610-24Ts-PoE+ x610-24Ts/X x610-24Ts/X-PoE+ x610-24SPs/X x610-48Ts x610-48Ts-PoE+ x610-48Ts/X x610-48Ts/X-PoE+	x610	x610-5.4.4-1.1.rel	x610-gui_544_07.jar	07/2014
x900-12XT/S x900-24XS x900-24XT	x900	x900-5.4.4-1.1.rel	x900-gui_544_07.jar	07/2014
SwitchBlade x908	SBx908	SBx908-5.4.4-1.1.rel	x900-gui_544_07.jar	07/2014
SwitchBlade x8106 SwitchBlade x8112	SBx8100	SBx81CFC400-5.4.4-1.1.rel SBx81CFC960-5.4.4-1.1.rel	SBx81CFC400_gui_544_07.jar Not applicable	07/2014



Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.

New Products in 5.4.4-1.1

AlliedWare Plus version 5.4.4-1.1 supports the following products that are new since 5.4.4-0.1.

x230 Series Enterprise PoE+ Gigabit Edge Switches

The Allied Telesis x230-GP Series of Layer 2+ Gigabit switches offer an impressive set of features in a compact design. Power over Ethernet Plus (PoE+) capability makes them ideal for powering access and security devices at the network edge.

Allied Telesis x230-GP Series switches provide optimal performance for connecting and remotely powering wireless access points, IP video surveillance cameras, and IP phones. The x230-10GP and x230-18GP provide 8 or 16 PoE+-capable Gigabit ports, and 2 SFP uplinks, for secure powered connectivity at the network edge.



Table 2: x230 Series models and port specifications

Product	10/100/1000T (RJ-45) Copper Ports	100/1000X SFP Ports	PoE Capable Ports	Switching Fabric	Forwarding Rate
AT-x230-10GP	8	2	8	20 Gbps	14.9 Mpps
AT-x230-18GP	16	2	16	36 Gbps	26.8 Mpps

For more information on the x230 Series switches, see the *x230 Series Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/x230

x310 Series Stackable Access Switches

The Allied Telesis x310 Series stackable access switches offer an impressive set of features in a high-value package, ideal for applications at the network edge.

The Allied Telesis x310 Series provide a high performing and scalable access solution for today's networks. With a choice of 24-port and 48-port 10/100BASE-T versions with Gigabit uplinks, Power over Ethernet (PoE), plus the ability to stack up to four units, the x310 Series is perfect for demanding applications at the edge of enterprise networks.



Table 3: x310 Series models and port specifications

Product	10/100BASE-T (RJ-45) Copper Ports	100/1000 Combo Uplink Ports	1 Gigabit Stacking Ports	PoE Capable Ports	Switching Capacity	Forwarding Rate
AT-x310-26FT	24	2	2	-	12.8 Gbps	6.5 Mpps
AT-x310-50FT	48	2	2	-	17.6 Gbps	10.1 Mpps
AT-x310-26FP	24	2	2	24	12.8 Gbps	6.5 Mpps
AT-x310-50FP	48	2	2	48	17.6 Gbps	10.1 Mpps

For more information on the x310 Series switches, see the *x310 Series Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/x310

SBx81XS16 Line Card for SBx8100 Series

The SBx81XS16 line card provides 16 x 10 Gigabit ports, enabling high-speed backbone connectivity from the core chassis to distribution devices.

The ability to partner 10 Gigabit Ethernet with Allied Telesis EPSRing™ (Ethernet Protection Switched Ring) technology allows the deployment of a high-speed distributed network solution. Failover in a little as 50ms prevents a node or link failure from affecting the customer experience, even with demanding applications such as IP telephony and video monitoring.



For more information on the SBx81XS16 line card, see our website at alliedtelesis.com/switches/sbx8100.

Key New Features and Enhancements

Software version 5.4.4-1.1 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-0.1.

This section summarizes the key new features. For a list of all new and enhanced features and commands, see [“Changes in this Version” on page 60](#). For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Cable Fault Locator

The Cable Fault Locator (CFL) is a cable diagnostic tool for copper (but not fiber) cables. You can select a port and the CFL will display, for that port, connection status or faults that exist in either the connected cable or in its terminations. The CFL operates using a technology known as Time Domain Reflectometry (TDR) to test all four pairs of wires inside the cable.

CFL is now supported on the x510 and x510-DP Series switches.

For more information see [“Cable Fault Locator Introduction” on page 75](#) and [“Cable Fault Locator Commands” on page 79](#).

In-Service Software Upgrade (ISSU)

ISSU is available on standalone SBx8100 Series switches with dual CFC960 control cards, and on switches using VCStack Plus to create a single virtual unit out of two chassis (where each chassis has a pair of CFC960 control cards). ISSU allows you to upgrade the software release running on the CFCs with no disruption to network traffic passing through the chassis.

AMF Enhancements

Allied Telesis Management Framework (AMF) is a sophisticated suite of management tools that provides a simplified approach to network management. Since its initial release in software version 5.4.3-1.4, AMF has been continually enhanced with features to increase its versatility. The latest enhancements are described below.

Backup to remote file server

You can now choose to store your switch’s backup data on a remote backup server rather than on the Master node’s external media. The server is used for both backup and recovery. Each AMF master can support up to two remote file servers, which are mounted on the Master’s file system.

Recovery progress LED indication

This feature displays the recovery status during automatic recovery. Two distinct flash patterns indicate the different possible states during node recovery: “node recovery in progress” and “node recovery failed”. You can use a new command (atmf recover led-off) during a recovery to turn off the progress indication and return the port LEDs to their normal running state.

Node provisioning You can now pre-configure, or provision, a port for a future node before it is added to the network. A provisioned node can be created as a new unique entity, or can be cloned using the backup data from an existing node. When you add the new node to the provisioned port in the AMF network, its configuration is automatically loaded from the information stored in the backup media, with no further effort from you.

Node cleaning A clean device is one that has had its previous release and configuration components removed. Thanks to the new **atmf cleanup** command you can now easily return a used switch to its original “out-of-the-box” state.

This process of cleaning is required when replacing a device with one that has been used previously and still retains components of its previous configuration. Once you have cleaned a switch, you can connect it to your AMF network and know that automatic node recovery will start effortlessly.

Release Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software release licenses are needed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license. For details, see:

- **“Licensing this Software Version on an SBx908 Switch” on page 67** and
- **“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 69.**

Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases need to be licensed for the SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:

- [“Licensing this Software Version on an SBx908 Switch” on page 67](#) and
- [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 69.](#)

Upgrading a VCStack

This software version supports VCStack “reboot rolling” upgrades. With the **reboot rolling** command, you can reduce downtime when upgrading a VCStack.

You can use the **reboot rolling** command to upgrade to 5.4.4-1.1 from any 5.4.4-0.x version.

However, if you want to use the **reboot rolling** command to upgrade from any 5.4.3-x.x version to 5.4.4-1.1, you must upgrade to 5.4.4-0.x first.

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

If the existing VCStack is running ...	then a new member can join the VCStack if it is running ...
any 5.4.4-0.x version	any 5.4.4-0.x version
5.4.4-1.1 or 5.4.4-1.2	5.4.4-1.1 or 5.4.4-1.2

Before you add a new switch to a stack, make sure the new switch’s version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.

ISSU (In-Service Software Upgrade)

This software version does not support ISSU: You cannot use ISSU to upgrade to this minor software version.

AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with switches running version 5.4.3-2.6 and later, or any 5.4.4-x.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

You can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-0.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).
2. Decide which AMF upgrade method is most suitable.
3. Initiate the AMF network upgrade using the selected method. To do this:
 - a. create a working-set of the switches you want to upgrade
 - b. enter the command **atmf reboot-rolling <location>** or **atmf distribute-firmware <location>** where **<location>** is the location of the .rel files.
 - c. Check the console messages to make sure that all switches are "release ready". If they are, follow the prompts to perform the upgrade.

Changes in this Version

Table 4 on page 60 lists all new and modified commands in this version and shows which chapter of the Software References has details of each command.

Table 5 on page 65 lists new and modified features in this version.

Table 6 on page 66 lists new and modified SNMP (Simple Network Management Protocol) MIBs (Management Information Bases) in this version.

If your existing configurations include commands modified or deprecated in this version (see the Status column in the following tables), check whether you need to modify these configurations. For full command descriptions, modes and examples, see the appropriate Software Reference for your switch.

Table 4: New and modified commands in 5.4.4-1.1

Command	Status	x210	x230	x310	IX5	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
atmf backup delete	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command removes a backup file from external media.
atmf backup server	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and configures remote file servers as the destination for AMF backups.
atmf backup stop	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and stops a backup that is currently running the master node you are logged onto.
atmf backup synchronize	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and initiates a system backup of files from your master node's active remote file server to its backup remote file server.
atmf cleanup	New	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	AMF Commands	This command erases data from nvs and flash, then reboots to put the device into a clean state ready to be used as a replacement node on a provisioned port.

Table 4: New and modified commands in 5.4.4-1.1

Command	Status	x210	x230	x310	IX5	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
atmf provision	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command tells an AMF port to expect that a new node will be connected to it later, and tells it the name of the expected node. This command needs to be run in Interface Configuration mode on master nodes only.
atmf provision node clone	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and is part of setting up the files that will download onto a provisioned node. It allows a customer to use another node as a basis for the provisioned one.
atmf provision node configure boot config	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and sets the configuration file to use during the next boot cycle. This command can also set a backup configuration file to use if the main configuration file cannot be accessed for an AMF provisioned node.
atmf provision node configure boot system	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and sets the release file to use during the next boot cycle. This command can also set a backup release file to use if the main configuration file cannot be accessed for an ATMF provisioned node.
atmf provision node create	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and creates a new directory for use with a provisioned node and is part of setting up the files that will download.

Table 4: New and modified commands in 5.4.4-1.1

Command	Status	x210	x230	x310	IX5	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
atmf provision node delete	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and removes files that would otherwise download onto a provisioned node.
atmf provision node license-cert	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and is used to set up the license certificate for a provisioned node.
atmf provision node locate	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and changes the working directory of the switch to that of a provisioned node in the backup media.
atmf recover led-off	New	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	AMF Commands	This command turns off the recovery failure flashing port LEDs and reverts the LEDs function to their normal operational mode.
erase factory-default	New	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	AMF Commands	This command erases data from nvs and flash to put the device in a clean state when rebooted.
show atmf backup	Modified	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and has been modified to include a new parameter server-status to display connectivity diagnostics information for each configured remote file server.
show atmf links	Modified	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command displays brief information about AMF links on a switch.
show atmf links detail	Modified	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command now displays detailed information about AMF links on a switch.

Table 4: New and modified commands in 5.4.4-1.1

Command	Status	x210	x230	x310	IX5	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
show atmf links statistics	Modified	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	In addition to its original function, this command is now also able to display the AMF link configuration and packet exchange statistics for a specified interface.
show atmf provision nodes	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Commands	This command is available on master nodes only and provides the user with details of a provisioned node created in the backup media.
clear test cable-diagnostics tdr	New	N	N	N	N	Y	N	N	N	N	N	Cable Fault Locator Commands	This command clears the results of a cable-diagnostics CFL test.
show test cable-diagnostics tdr	New	N	N	N	N	Y	N	N	N	N	N	Cable Fault Locator Commands	This command displays the results of a cable-diagnostics CFL test.
test cable-diagnostics tdr interface	New	N	N	N	N	Y	N	N	N	N	N	Cable Fault Locator Commands	This command initiates cable-diagnostics tests to twisted pair data cables in order to detect either correct, short, or open circuit terminations.
show boot	Modified	N	N	N	N	N	N	N	N	N	Y	File Management Commands	This command now provides ISSU version status information.
show version	Modified	N	N	N	N	N	N	N	N	N	Y	File Management Commands	The show output now displays a message whenever ISSU is running.
issu abort-timeout	New	N	N	N	N	N	N	N	N	N	Y	ISSU Commands	This command initiates an abort timeout to apply when running an ISSU.
issu boot	New	N	N	N	N	N	N	N	N	N	Y	ISSU Commands	This command initiates an ISSU.
issu rejoin-timeout	New	N	N	N	N	N	N	N	N	N	Y	ISSU Commands	This command configures the ISSU CFC rejoin timeout that will be applied to each CFC.
show issu	New	N	N	N	N	N	N	N	N	N	Y	ISSU Commands	This command shows the ISSU configuration and its process status.

Table 4: New and modified commands in 5.4.4-1.1

Command	Status	x210	x230	x310	IX5	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
type issu	New	N	N	N	N	N	N	N	N	N	Y	Trigger Commands	This new command configures a trigger that will activate if the automatic phase of the ISSU process enters one of the following selectable states: upgraded, completed, or aborted.
exception coredump size	Deleted	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Logging Commands	This command has been deprecated in 5.4.4 release and deleted in 5.4.4-1.1 release. There are no alternative commands.
show card	Modified	N	N	N	N	N	N	N	N	Y	Y	System Configuration and Monitoring Commands	When running this command while ISSU is actively rebooting CFCs, an asterisk is now appended to the line card's state on the output. This indicates that the card is not running the same software version as the chassis' active CFC. An explanation line is also added at the end of the output.
show card detail	Modified	N	N	N	N	N	N	N	N	Y	Y	System Configuration and Monitoring Commands	This command now provides software version information.
show system	Modified	N	N	N	N	N	N	N	N	Y	Y	System Configuration and Monitoring Commands	This command now displays a warning message when ISSU is in progress.
type issu	New	N	N	N	N	N	N	N	N	N	Y	Trigger Commands	This command configures a trigger to that will activate at a selected point in the ISSU process.

Table 5: New and modified features in 5.4.4-1.1

Feature	Status	IX5	x210	x230	x310	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
Cable fault locator	New	N	N	N	N	Y	N	N	N	N	N	Cable Fault Locator Introduction	The Cable Fault Locator (CFL) is a new diagnostic tool that can detect faults in a port's connection cable or its terminations.
AMF: Interoperability with xSTP	Modified	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	AMF Introduction and Configuration	RSTP, STP, and MSTP now interoperate with the Allied Telesis Management Framework (AMF). You can now use any of these spanning tree protocols to control loops in your AMF network.
AMF: Node provisioning	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Introduction and Configuration	You can now pre-configure, or provision, a future node before it is added to the network. A provisioned node can be created as a new, unique entity, or can be cloned using the backup data from an existing node.
AMF: Restoring a Node to a "Clean" state	New	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	AMF Introduction and Configuration	You can now use the new atmf cleanup command to return a device to a clean state after a device failure in order for AMF automatic node recovery to work.
AMF: Using a remote backup server	New	N	N	N	N	N	Y	N	Y	Y	Y	AMF Introduction and Configuration	System backup data can now be held on a remote backup server rather than on the Master node's external media.
In-Service Software Upgrade (ISSU)	New	N	N	N	N	N	N	N	N	N	Y	ISSU Commands	The In-Service Software Upgrade (ISSU) feature enables you to upgrade the software running on the CFC960 cards residing in either a stand alone x8100 switch or an x8100 VCStack Plus, while still forwarding data traffic.

Table 6: New MIBs in 5.4.4-1.1

Feature	Status	IX5	x210	x230	x310	x510	x610	x900	SBx908	SBx8100 CFC400	SBx8100 CFC960	Software Reference Chapter	Description
AT-CHASSIS-MIB	New	N	N	N	N	N	N	N	N	N	Y	SNMP MIBs	A number of new objects have been added to this MIB. These relate to chassis card version (for ISSU), chassis mapping tables, and card IDs.

Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- **Obtain the MAC address for a switch**
- **Obtain a release license for a switch**
- **Apply a release license on a switch**
- **Confirm release license application**

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the **show system mac license** command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the **license certificate** command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands **show license** or **show license brief** to confirm release license application.

On a stacked switch, use the command **show license member** or **show license brief member** to confirm release license application.

From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Features included : EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64,
                  RADIUS-100, RIP, VRRP

Index          : 2
License name    : 5.4.4-r1
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Release        : 5.4.4
```

Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- **Obtain the MAC address for a control card**
- **Obtain a release license for a control card**
- **Apply a release license on a control card**
- **Confirm release license application**

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the **license certificate** command on the stack master will automatically apply the release licenses to all the control cards within the stack.

Step 1: Obtain the MAC address for a control card

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the **show system mac license** command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:

Card                MAC Address
-----
1.5                 eccd.6d9e.3312
1.6                 eccd.6db3.58e7

Chassis MAC Address eccd.6d7b.3bc2
```

Step 2: Obtain a release license for a control card

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a control card

Use the **license certificate** command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license

1 license installed.
```

Step 4: Confirm release license application

On a stand-alone chassis, use the commands **show license** or **show license brief** to confirm release license application.

On a stacked chassis, use the command **show license member** or **show license brief member** to confirm release license application.

From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Features included : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100
                  Virtual-MAC, VRRP

Index          : 2
License name    : 5.4.4-rl
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Release        : 5.4.4
```

Installing this Software Version



Caution: Software version 5.4.4-1.1 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see [“Licensing this Software Version on an SBx908 Switch” on page 67](#) and [“Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 69](#).

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.
2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.

```
awplus# copy tftp flash
```

Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:

```
awplus# configure terminal
```

Then set the switch to reboot with the new software version:

Switch	Command
x210 Series	<code>awplus(config)# boot system x210-5.4.4-1.1.rel</code>
x230 Series	<code>awplus(config)# boot system x230-5.4.4-1.1.rel</code>
x310 Series	<code>awplus(config)# boot system x310-5.4.4-1.1.rel</code>
IX5-28GPX	<code>awplus(config)# boot system IX5-5.4.4-1.1.rel</code>
x510 Series	<code>awplus (config)# boot system x510-5.4.4-1.1.rel</code>
x610 Series	<code>awplus(config)# boot system x610-5.4.4-1.1.rel</code>
x900 Series	<code>awplus(config)# boot system x900-5.4.4-1.1.rel</code>
SBx908	<code>awplus(config)# boot system SBx908-5.4.4-1.1.rel</code>
SBx8100 with CFC400	<code>awplus(config)# boot system SBx81CFC400-5.4.4-1.1.rel</code>
SBx8100 with CFC960	<code>awplus(config)# boot system SBx81CFC960-5.4.4-1.1.rel</code>

Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus(config)# exit
```

```
awplus# show boot
```

5. Reboot using the new software version.

```
awplus# reload
```

Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (**.jar**) gives the earliest version of the software file (**.rel**) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- PC Platform:
Windows XP SP2 and up / Windows Vista SP1 and up
- Browser: (must support Java Runtime Environment (JRE) version 6)
Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (**.jar** extension) onto your TFTP server, SD card or USB storage device.
2. Connect to the switch's management port, then log into the switch.
3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.

To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# interface vlan1
```

```
awplus(config-if)#ip address <address>/<prefix-length>
```

Where *<address>* is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:

```
awplus(config-if)# ip address 192.168.2.6/24
```

5. If required, **configure a default gateway for the switch.**

```
awplus(config-if)# exit
```

```
awplus(config)# ip route 0.0.0.0/0 <gateway-address>
```

Where *<gateway-address>* is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.

6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.

TFTP server: Use the command:

```
awplus# copy tftp://<server-address>/<filename.jar> flash:/
```

SD card: use the command:

```
awplus# copy card:/<filename.jar> flash:/
```

USB storage device: use the command:

```
awplus# copy usb:/<filename.jar> flash:/
```

where <server-address> is the IP address of the TFTP server, and where <filename.jar> is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# service http
```

The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.

```
awplus(config)# username <username> privilege 15 password  
                  <password>
```

You can create multiple users to log into the GUI. For information about the **username** command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser

On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.

Next, click on the 'Security' tab. Ensure the 'Enable Java content in the browser' checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List

Click on the 'Edit Site List' button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the 'Exception Site List' dialog, enter the IP address you configured in Step 4, with a http:// prefix.

After entering the URL click the Add button then click OK.

11. Log into the GUI.

Start a browser and enter the switch's IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.

Cable Fault Locator Introduction

Contents

Introduction to the Cable Fault Locator	76
Capabilities.....	76
TDR Operating Principles.....	76
Using the Cable Fault Locator	77

Introduction to the Cable Fault Locator

The Cable Fault Locator (CFL) is a cable diagnostic tool located within the switch. For a selected port, the CFL will display connection status or faults that exist in either the connecting cable itself, or its terminations.

Capabilities

The CFL is designed to operate on cable systems that utilize the following:

- fixed copper ports, i.e. not using SFP type pluggable transceivers.
- unshielded twisted pair data cables such as CAT 5 or CAT 6 and up to 100 meters long.
- cable terminations that use RJ-45 or RJ-0.5 connections.
- data rates from 10 Mbps to 1 Gbps (10 Gbps over copper cable is not supported).

The CFL operates using a technology known as Time Domain Reflectometry (TDR) to test all four pairs of wires inside the cable.

TDR Operating Principles

When a data cable is correctly terminated, the data energy traveling along it is absorbed by its terminating load resistance. However, if the cable is unplugged, broken or short circuited, this energy is reflected at the cable termination and travels back along the cable towards its source connection.

To test the cable, the CFL generates a pulse at the cable source connection and monitors the cable for the presence of a returning (reflected) pulse. By measuring the timing between the transmitted and reflected pulses, the CFL can calculate the distance between a fault (usually at the distant termination) and cable's source connection. Also, by detecting the polarity of the reflected signal, the CFL can determine whether the fault is due to an open circuit, or a short circuit, condition.

Note that CFL cannot run on a port that is currently supplying power via PoE.

Using the Cable Fault Locator

To run a CFL diagnostics test, use the command, **“test cable-diagnostics tdr interface”** on page 82. This will return a prompt asking you to confirm whether or not you want to continue with the test. This confirmation prompt is generated because the link is unable to carry data during the test, typically taking between 1 and 2 seconds to complete.

Example To run a CFL test on the cable inserted into port 1.0.1 use the following command:

```
awplus# test cable-diagnostics tdr interface
port1.0.1
```

This command returns the following message:

Link will go down while test is in progress. Continue? (y/n):

Select y to continue.

```
awplus# y
```

Answering y returns the following message:

Test started. This will take several seconds to complete. Use "show test cable-diagnostics tdr" to print results.

Once the cable test has run you can display its results by running the **show test cable-diagnostics tdr command** on page 81.

Output **Figure 1: Example output from the show test cable-diagnostics tdr command**

Port	Pair	Length	Status
1.0.1	A	-	OK
	B	-	OK
	C	5 +/- 5 m	Open

From the monitoring tests described, the CFL presents cable termination status information as shown, together with explanations, in **Table 1**.

Table 1: Cable Status Table

Status	Definition
OK	The pair is good and is terminated.
Open	The pair is not terminated.
Short (within-pair)	There is a short between the two wires of the pair.
Short (cross-pair)	There is a short between wires of different pairs.
Error	The test was unable to get a result. This error condition may occur when connecting to remote devices that issue idle traffic data when operating in the 10/100 M mode.

Cable Fault Locator Commands

Contents

clear test cable-diagnostics tdr	80
show test cable-diagnostics tdr	81
test cable-diagnostics tdr interface	82

clear test cable-diagnostics tdr

This command clears the results of the last cable test that was run.

Syntax `clear test cable-diagnostics tdr`

Mode Privileged Exec

Examples To clear the results of a previous cable-diagnostics test use the following commands:

```
awplus# clear test cable-diagnostics tdr
```

show test cable-diagnostics tdr

This command displays the results of the last cable-diagnostics test that was run using the TDR (Time Domain Reflectometry) on a fixed copper cable port.

The displayed status of the cable can be either:

- OK
- Open
- Short (within-pair)
- Short (across-pair)
- Error

Syntax show test cable-diagnostics tdr
no enable

Mode Privileged Exec

Examples To show the results of a cable-diagnostics test use the following command:

```
awplus# show test cable-diagnostics tdr
```

Output **Figure 1: Example output from the show test cable-diagnostics tdr command.**

Port	Pair	Length	Status
1.1.1	A	-	OK
	B	-	OK
	C	5 +/- 5 m	Open

test cable-diagnostics tdr interface

This command applies the Cable Fault Locator's (CFL) cable-diagnostics tests to twisted pair data cables for a selected port. The tests will detect either correct, short circuit, or open, circuit terminations. For more information on running the CFL, see the [Cable Fault Locator Introduction](#) chapter.

The test can take several seconds to complete. See the related show command to display the test results.

A new test can only be started if no other test is in progress. CFL cannot run on a port that is currently supplying power via PoE.

The displayed status of the cable can be either, OK, Short (within-pair), or Open. The "Open" or "Short" status is accompanied with the distance from the source port to the incorrect termination.

Syntax test cable-diagnostics tdr interface <interface>.

Parameter	Description
cable-diagnostics	The cable diagnostic tests.
tdr	Time Domain Reflectometry.
interface	Selects the interface to test.
<interface>	Interface number of the port to be tested, i.e. 1.0.2.

Example To run a cable test on the cable inserted into port 1.0.1 use the following command:

```
awplus# test cable-diagnostics tdr interface
port1.0.1
```

You will receive the following message:

```
Link will go down while test is in progress. Continue? (y/n):
y Select y to continue.
```

```
awplus# y
```

You will then receive the following message:

```
Test started. This will take several seconds to complete. Use
"show test cable-diagnostics tdr" to print results.
```

ISSU Introduction

Contents

Introduction to ISSU	84
Operating Requirements	84
Key Concepts	84
ISSU Operation	85
ISSU Phases	85
Initiating the ISSU Automatic Phase	87
Initiating the ISSU Manual Phase	88
Errors and Recovery	88
Automating the ISSU Process Using Triggers	90
Related Information	91

Introduction to ISSU

The In-Service Software Upgrade feature (ISSU) enables you to upgrade the software running on the Controller Fabric Cards (CFCs) residing in either a standalone x8100 switch, or stacked using x8100 VCStack Plus, while still forwarding data traffic.

Operating Requirements

ISSU is supported on the SwitchBlade x8100 Series chassis (or VCStack Plus). ISSU support is subject to the following conditions:

- Your Controller Fabric cards must be CFC960. CFC400 cards do not support ISSU.
- Each chassis must contain two CFC960 cards to provide full ISSU functionality and continuous network availability. You can however, still run the **issu boot command on page 94** with only one CFC card installed. This operation is subject to there being a two chassis stack with at least one line card in each chassis, and there will be some network down-time as each line card reboots. Note that in this scenario - unlike the ISSU operation - all line cards and CFCs will reboot simultaneously causing a complete network outage on the chassis during this period.

Key Concepts

The ISSU feature enables you to upgrade the software in each of the CFC960 controller cards located within either a single chassis, or a stack of two x8100 chassis, while still continuing to forward traffic. However, note that at the completion of ISSU's automatic phase, there will be a temporary mismatch between the software version running on the controller cards, and that running on the Line Interface cards (LFIs). In order to complete the ISSU process, the line cards must be rebooted to bring their software into line with their CFCs.

Whether or not this process results in a network outage depends on the degree of resiliency that is designed into the network itself. For example, in the network shown in the section "VCStack Plus Resilient Stacked Topology Example" in the Software Reference, VCStack Plus Introduction chapter, the CFC ISSU can be automatically accomplished, and the manual line cards can be sequentially rebooted without halting the network traffic to any of their remotely connected devices.

However, even in situations where the network has been designed for port density rather than resiliency and does not use link aggregation to backup downstream devices, ISSU still enables you to upgrade the CFCs to a later software version, and in addition allows you time to schedule the line card reboots for a period of low network activity. Triggers can also be employed to automatically schedule these reboots for an out of hours operating period - see **"Automating the ISSU Process Using Triggers" on page 90**. Note that all CFCs and line cards must be running the same software release before a subsequent ISSU can be applied.

An important point to note is that in the ISSU processing order, the Active CFC is the last controller card to be upgraded. For this reason when the Active CFC's software is upgraded, it hands over its "Active CFC" role to the card having the next highest priority. In practice this will be the CFC in bay 1.5 to that in bay 1.6. Thus, applying an ISSU will result in a semi permanent change of the card that is the stack's Active CFC. This new CFC will retain this role until the stack is next rebooted.

ISSU Operation

During the ISSU process, each CFC within either the chassis, or VCS Plus stack, is sequentially rebooted. For this process, ISSU sets the boot system configuration to boot using the release being upgraded to. When the stack is then rebooted, the CFCs start with the newly applied release.

Initially, ISSU gathers information about each of the CFC nodes within the stack. It uses this information to record which CFCs have been upgraded and which are yet to be upgraded. ISSU then processes this information in node ID order, starting with the CFC that has the highest node ID and ending with the CFC that has the lowest. Once a node has finished “syncing,” the next node is rebooted. The Active CFC is left until all the CFC nodes have been rebooted.

ISSU provides the following operating facets:

- Designed for Allied Telesis chassis products such as the x8100 Series switch.
- CFCs are sequentially upgraded with no network downtime and only a single fast failover.
- Line cards must be manually upgraded (or automatically upgraded using triggers) once the CFC upgrade process is complete, i.e. before the next ISSU is attempted.
- During the ISSU process, two different software releases will be running simultaneously on the chassis.
- Communication between cards continues while ISSU is in progress.

ISSU Phases

The ISSU process should be considered as having two phases.

1. An automatic phase, during which the CFCs are automatically upgraded.
2. A manual phase, during which the line cards are manually upgraded.

The ISSU process is only considered complete once all CFCs and line cards are running the new software version.

Automatic Phase

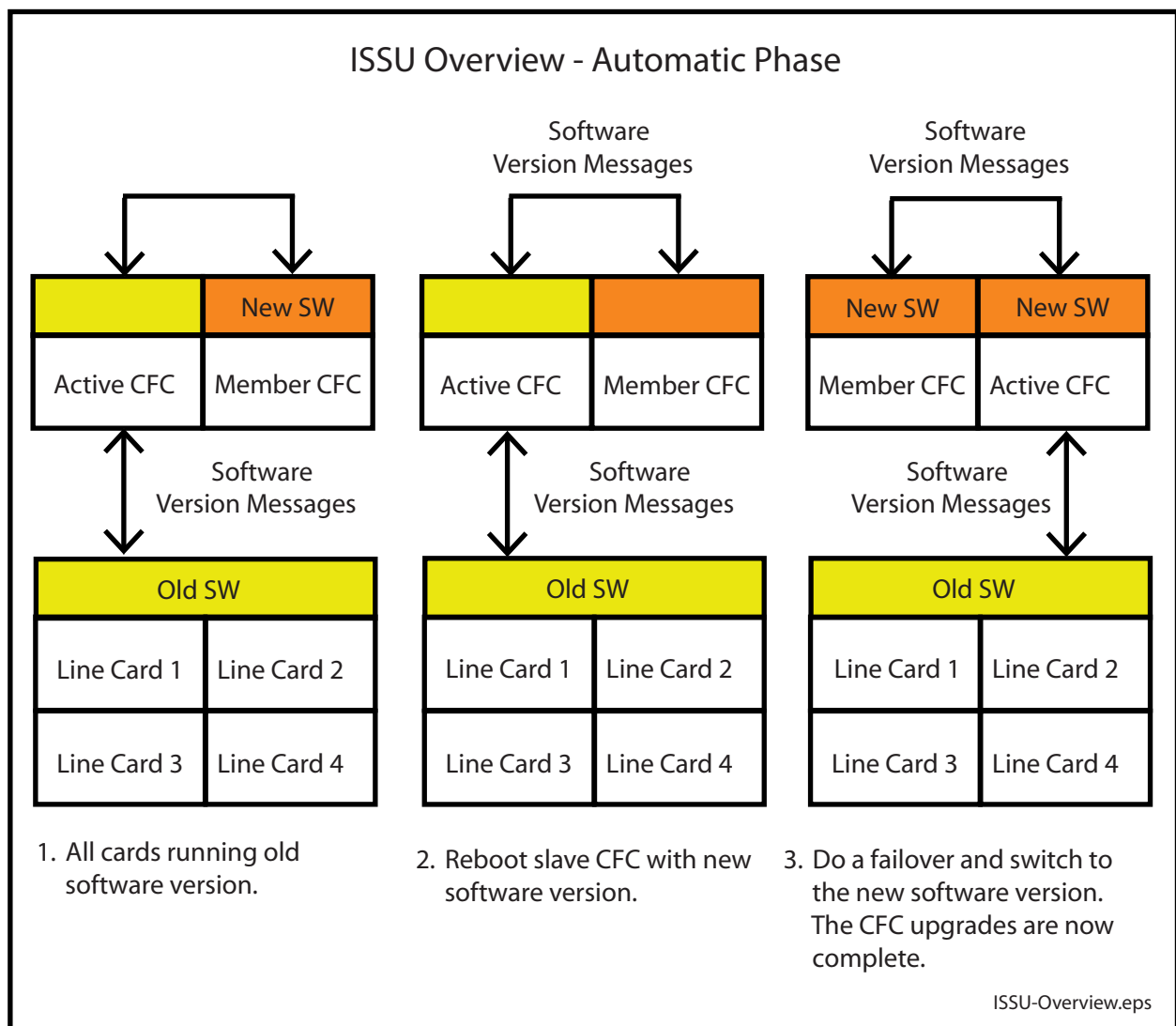
This phase of ISSU begins by comparing the first three numbers of the running versions against the version being upgraded to. For the ISSU process to successfully apply, these three numbers must match. However, no system check is made on either the minor or maintenance components, -x.y. Presently, ISSU can be tested by applying an upgrade from 5.4.4-1.1 to the same version, and can be applied in active operation when the move is made from the current version 5.4.4-1.1, to the next maintenance version 5.4.4-1.2. To what extent ISSU compatibility extends to the minor and maintenance components for future releases and how these will apply will be documented in the release notes for each specific build.

The software release that is configured using the **boot system command** must be available for all CFCs before ISSU can begin. The release must be locally stored on flash or a usb storage device. This release will be used (rolled back to) if there is an error in the ISSU process.

For ISSU to progress, the above conditions must be met and there must be no pre-existing ISSU operation in progress. If ISSU is unable to progress, a warning message will be printed to the console. Similarly, when using VCStack Plus, if one of the chassis has only a single CFC, the console will first display a warning message followed by a confirmation message.

The diagram of **Figure 1 on page 86** illustrates ISSU's automatic phase. This diagram shows that the first step is to upgrade the software on the Member CFC. During this step the line cards are still running the old software version from the existing Active CFC. Once this step is complete, the Active CFC is deactivated and receives the software upgrade. At this time the stack Active CFC role moves from the existing Active CFC to the Member CFC. Once this process is complete the line cards can be manually upgraded.

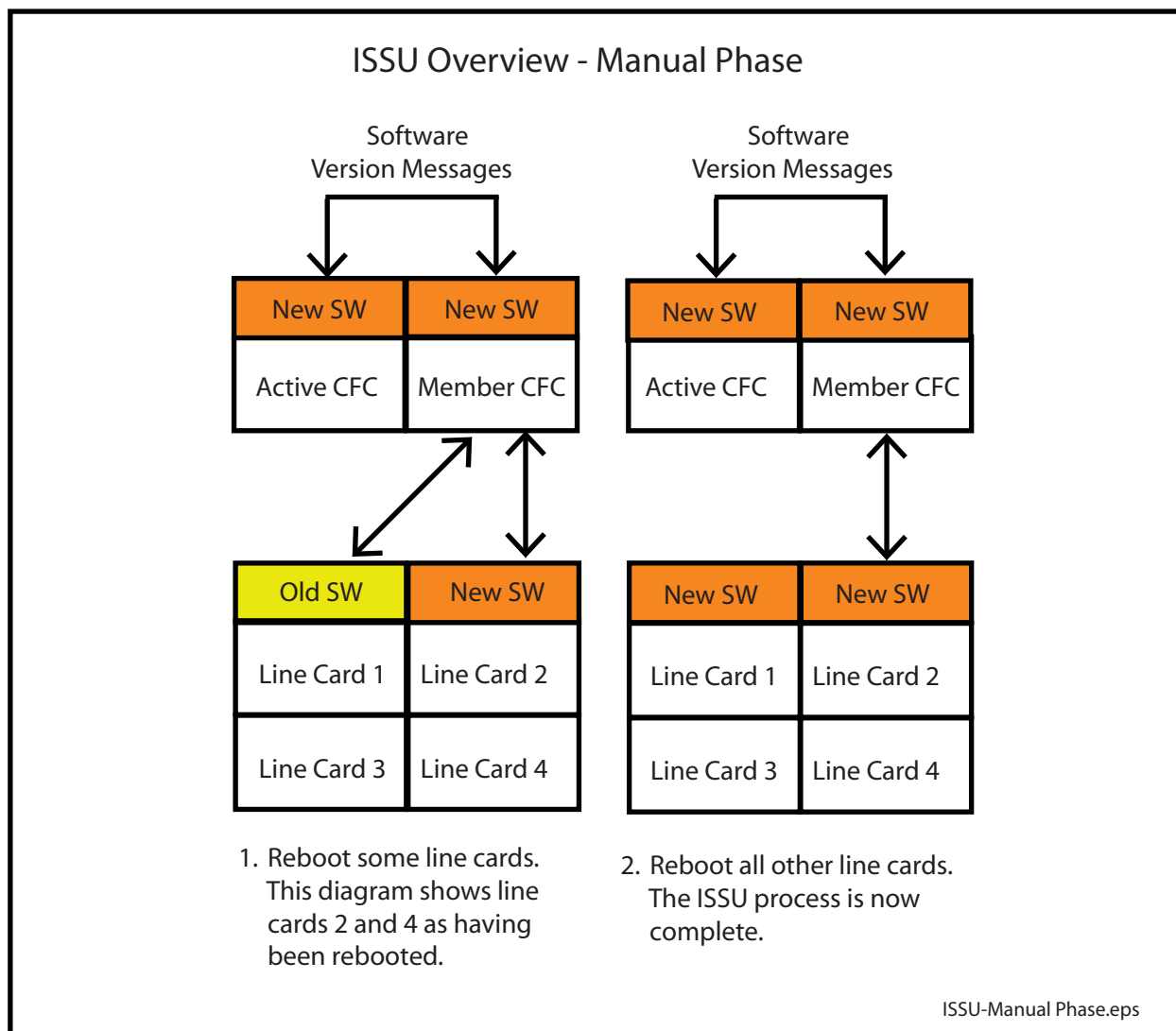
Figure 1: Illustration Showing ISSU's Automatic Phase



Manual Phase

This phase comprises rebooting each of the line cards. The diagram shown in **Figure 2 on page 87** illustrates ISSU's manual phase.

Figure 2: Illustration Showing ISSU's Manual Phase



Initiating the ISSU Automatic Phase

In order to perform an ISSU, the following conditions must be met:

- You must have a chassis (or a stack) with more than one CFC960 inserted. Note that ISSU will not operate with CFC400 cards.
- There must be no previous ISSU operation in progress.
- The software specified by the CLI must be a valid AW+ release for the running system; that is, it must be on the same maintenance branch as that used currently. For example, 5.4.4.
- The release that is configured using the **boot system command** must be available for all stack members.

Use the **issu boot** command to complete the automatic phase of the ISSU operation.

Example To upgrade a system with a release file in the Flash, SBx81CFC960-5.4.5-1.2.rel, use the command:

```
awplus# issu boot SBx81CFC960-5.4.5-1.2
```

Initiating the ISSU Manual Phase

In order to complete the ISSU process all the LIFs must be rebooted. You use the **reboot card** command to successively reboot each line card in your switch.

Example To reboot the line card in slot 1 of chassis 2, use the command:

```
awplus> enable
awplus# reboot card 2.1
reboot card 2.1 system? (y/n): y
```

If the specified card does not exist in the chassis, the command is rejected.

Errors and Recovery

If an error occurs during the ISSU process (such as a CFC failing to rejoin the chassis, or the Active CFC leaving the stack) the ISSU process will halt, and one of two conditions can result:

- If the ISSU process fails before the new active master CFC is running the new release, then the boot system configuration is reset, and the old release reverts to being the primary release. In effect, the stack returns to its pre ISSU condition.
- If the new Active CFC is running the new release, the new release becomes the primary release

Either situation requires manual intervention by rebooting all stack members that are not running the same release as the stack Active CFC.

If the ISSU process aborts, the reason can be viewed by displaying the **show issu** command. You can use this show output and the logs produced to help determine the cause of the failure. The most common failure is likely to be due to the node rejoin time expiring. This could be because the configuration takes too long to replay, and the CFC cannot rejoin the stack before the rejoin timer expires. If this happens a solution might be to increase the value of the node rejoin timer.

Example To display the ISSU state, use the command:

```
awplus# show issu
```

Output This is a sample output from the **show issu command** following a fault condition.

```
awplus#show issu
ISSU configuration:
Node rejoin timeout      : 10 mins (default)
Abort timeout            : 45 mins (default)

ISSU state               : Aborted
Old boot release         : SBx81CFC960-5.4.4-1.1.rel
New boot release         : SBx81CFC960-5.4.4-1.2.rel
Process started          : Fri May 23 14:54:11 2014
Process elapsed          : 00:50:56
Abort reason              : the rebooting CFC failed to rejoin the
chassis

Progress on CFCs:
card 1.5                 : Not upgraded
card 1.6                 : Not upgraded
card 2.5                 : Upgrading
card 2.6                 : Upgraded
```

Automating the ISSU Process Using Triggers

You will probably want to upgrade your software at a convenient time for your operation.

One possibility is to upgrade the CFCs during a time when technical staff are available and use the automatic phase of ISSU to eliminate, or at least reduce, system downtime. Then use triggers to apply the line card upgrades for a period when the network has either a low usage, or a scheduled maintenance period.

In the following example, we assume that the automatic phase of ISSU has been successfully completed, and that you want to use triggers to implement a reboot of your line cards.

Caution ISSU trigger scripts that use any type other than "ISSU Completed" must not place the switch into Configuration Mode.



Step 1: Quantify the line cards that need to be upgraded

Use the following command to display summary information about the cards in your switch or VCStack Plus.:

```
awplus# show card
```

Output Figure 3: Example output from the show card command

```
show card

Stack member 1

Card  Type                State
-----
1.1    AT-SBx81GP24            Online
1.2    -                        -
1.3    -                        -
1.4    -                        -
1.5    AT-SBx81CFC960          Online (Standby)
1.6    AT-SBx81CFC960          Online (Standby)
-----

Stack member 2

2.1    AT-SBx81GP24            Online
2.2    -                        -
2.3    -                        -
2.4    -                        -
2.5    AT-SBx81CFC960          Online (Active)
2.6    AT-SBx81CFC960          Online (Standby)
-----
```


Step 2: Write scripts and create the triggers

Example One From the show output, the AT-SBx81GP24 line cards in card slots 1.1 and 2.1 need to be rebooted. You decide that a good time to do this is Sunday at 1:00 a.m.

Create the following script “lif.scp” that will reboot these cards:

Write the Script

```
enable
reboot card 1.1
y
wait 120
reboot card 2.1
y
```

Create the Trigger Next, create a trigger called “trigger 1” that will run this script at the desired time:

```
trigger 1
type time 01:00
repeat once
day sunday
script 1 lif.scp
```

Example Two An alternative arrangement might be for the line cards to be rebooted during the day. This method uses a trigger that would activate when the ISSU reaches CFC Upgraded, i.e. that the automatic phase has successfully completed.

Create the following script “lif.scp” that will reboot these cards:

Write the Script

```
enable
reboot card 1.1
y
wait 120
reboot card 2.1
y
```

Create the Trigger

```
trigger 1
type issu cfcs-upgraded
script 1 lif.scp
```

Related Information

For more information on creating and using triggers, see the Triggers Introduction chapter and the [type issu command on page 107](#).

ISSU Commands

Contents

issu boot	94
issu abort-timeout	95
issu rejoin-timeout.....	96
show issu	97
show boot.....	98
show card.....	100
show card detail	102
show system	105
show version.....	106
type issu.....	107

issu boot

To perform an ISSU, you must have a chassis (or VCStack Plus) with more than one CFC960 (Controller Fabric Card). Note that ISSU will not run with CFC400 cards, nor will it run if there is already an ISSU process in progress. Therefore a new ISSU cannot start until all CFC960s and LIFs (Line Interface cards) are running with the same software release.

The software specified by the Command Line Interface (CLI) must be a valid AW+ release for the running system and on the same maintenance branch as the currently running software, such as version 5.4.4.

If any of these preconditions are not met, ISSU will not start, and a warning message will be printed to the console.

In a VCStack Plus configuration, if one of the chassis has only a single CFC, the console will first display a warning message followed by a confirmation message.

Syntax `issu boot <file>`

Parameter	Description
<code><file></code>	URL of the release file - either a USB or Flash. Note that if set to a release on USB, then each CFC requires a USB drive to be present. The new release will then be synced to each USB drive, and the location ISSU boots each CFC from will be USB. We recommend that the file be loaded from Flash.

Mode Privileged Exec

Examples To upgrade a system with a release file in the Flash, SBx81CFC960-5.4.4-1.2.rel, use the command:

```
awplus# issu boot SBx81CFC960-5.4.4-1.2.rel
```

Related Commands [issu abort-timeout](#)
[issu rejoin-timeout](#)
[show issu](#)

issu abort-timeout

This command configures the ISSU abort timeout. This is the time period that the ISSU process waits for an acknowledgment that all CFCs have rebooted. If the ISSU process fails to receive all acknowledgments within the specified timeout period, it will abort the process.

The **no** variant of this command resets ISSU abort timeout to its default value.

Syntax `issu abort-timeout <20-120>`

`no issu abort-timeout`

Parameter	Description
<code><20-120></code>	The number of minutes set for the abort timeout period.

Default 45 minutes.

Mode Global Configuration Mode

Example s To change the ISSU abort timeout to 60 minutes, use the command:

```
awplus(config)# issu abort-timeout 60
```

Related Commands

- [issu abort-timeout](#)
- [issu boot](#)
- [issu rejoin-timeout](#)
- [show issu](#)

issu rejoin-timeout

This command configures the ISSU CFC rejoin timeout that will be applied to each CFC. Following a reboot, this timeout sets the period that the ISSU process will wait for each CFC to join the chassis. If any of the CFC cards fail to rejoin the chassis within the period configured by this command, the ISSU process is aborted.

The **no** variant of this command resets ISSU node rejoin timeout to its default value.

Note The ISSU process will only operate with CFC960 cards.



Syntax `issu rejoin-timeout <7-30>`
`no issu rejoin-timeout`

Parameter	Description
<code><7-30></code>	The number of minutes set for the timeout period.

Default 10 minutes before timing out.

Mode Global Configuration

Examples To change the ISSU node rejoin timeout to 15 minutes, use the command:

```
awplus# configure terminal
awplus(config)# issu rejoin-timeout 15
```

Related Commands [issu abort-timeout](#)
[issu boot](#)
[show issu](#)

show issu

This command shows the ISSU configuration and its process status.

Syntax show issu

Mode Privileged Exec

Example To display the ISSU state, use the command:

```
awplus# show issu
```

Output This is a sample output from the `show issu` command


```
ISSU configuration:
CFC rejoin timeout : 10 mins (default)
Abort timeout : 45 mins (default)
ISSU state : Upgrading Standby
Old boot release : SBx81CFC960-5.4.4-1.1.rel
New boot release : SBx81CFC960-5.4.4-1.2.rel
Process started : Mon May 5 09:48:43 2014
Process elapsed : 00:00:03
CFC rejoin timer : 00:09:56 remaining
Abort timer : 00:44:56 remaining
Progress on CFCs:
card 1.5 : Not upgraded
card 1.6 : Not upgraded
card 2.5 : Not upgraded
card 2.6 : Upgrading
```

show boot

This command displays the current boot configuration. We recommend that the currently running release is set as the current boot image. ISSU will not execute if there is no current boot image.

Syntax `show boot`

Mode Privileged Exec

 **Note** When running ISSU, this command will compare the software versions that are running on each of the CFCs. Where there is a difference in versions running on either VCStack Plus, or a standalone chassis, an asterisk is appended to the current version. An explanation is also shown at the end of the output screen indicating what further action can be taken.

Example To show the current boot configuration, use the command:

```
awplus# show boot
```

Output **Figure 1: Example output from the show boot command with the current boot configuration set on a USB storage device**

```
awplus#show boot
Boot configuration
-----
Current software   : SBx81CFC960-5.4.4-1.2.rel
Current boot image : usb:/SBx81CFC960-5.4.4-1.2.rel
Backup boot image  : flash:/SBx81CFC960-5.4.4-1.1.rel
Default boot config: flash:/default.cfg
Current boot config: usb:/my.cfg (file exists)
Backup boot config: flash:/backup.cfg (file not found)
```

Figure 2: Example output from the show boot command with ISSU running

```
#show boot
Boot configuration
-----
Current software   : SBx81CFC960-5.4.4-1.2.rel*
Current boot image : flash:/SBx81CFC960-5.4.4-1.2.rel
Backup boot image  : flash:/SBx81CFC960-5.4.4-0.1.rel
Default boot config: flash:/default.cfg
Current boot config: flash:/example.cfg (file exists)
Backup boot config : flash:/backup.cfg (file exists)
* ISSU in progress - Run "show card detail" for more information
```


Figure 3: Example output from the show boot command

```
awplus#show boot
Boot configuration
-----
Current software   : SBx81CFC960-5.4.4-1.2.rel
Current boot image : flash:/SBx81CFC960-5.4.4-1.2.rel
Backup boot image  : flash:/SBx81CFC960-5.4.4-1.1.rel
Default boot config: flash:/default.cfg
Current boot config: flash:/my.cfg (file exists)
Backup boot config: flash:/backup.cfg (file not found)
```

Table 1: Parameters in the output of the show boot command

Parameter	Description
Current software	The current software release that the device is using.
Current boot image	The boot image currently configured for use during the next boot cycle.
Backup boot image	The boot image to use during the next boot cycle if the device cannot load the main image.
Default boot config	The default startup configuration file. The device loads this configuration script if no file is set as the startup-config file.
Current boot config	The configuration file currently configured as the startup-config file. The device loads this configuration file during the next boot cycle if this file exists.
Backup boot config	The configuration file to use during the next boot cycle if the main configuration file cannot be loaded.

Related Commands

autoboot enable
boot config-file backup
boot system backup

show card

Use this command to display information about current and provisioned slots for chassis line cards or control cards. Note that when ISSU is actively rebooting CFCs an asterisk is displayed beside a line card's state to indicate that the card is not running the same software version as its Active Master CFC. An explanation line is also added at the end of the display.

Syntax `show card`

Mode Privileged Exec

Example To display summary information about the cards, use the following commands:

```
awplus# show card
```

Output **Figure 4: Example output from the show card command**

```
awplus# show card
Card  Type                      State
-----
1.1   AT-SBx81GP24                 Online
1.2   AT-SBx81XS6                 Online
1.3   AT-SBx81GP24                 Online *
1.4   -                             -
1.5   AT-SBx81CFC960              Online (Active)
1.6   AT-SBx81CFC960              Online (Standby)
1.7   AT-SBx81GS24a               Online *
1.8   -                             -
1.9   -                             -
1.10  -                             -
1.11  AT-SBx81GT24                 Online
1.12  AT-SBx81GS24a               Online
* Is running a different sw version to the Active CFC -
needs a reboot
```

Table 2: Parameters in the output of the show card command

Parameter	Description
Card	Chassis number and slot number of the card installed.
Type	Product name of the card installed in the slot. If no card is installed, but a slot has been provisioned, then the provisioned board class is displayed, for example "ge24". If no card has been installed or slot provisioned then "-" is displayed.

Table 2: Parameters in the output of the show card command (cont.)

Parameter	Description
State	The current state of the card. One of the following:
	Booting The card is currently loading its software release.
	Initializing The card has loaded its software release and is currently initializing software processes.
	Joining The card is communicating with other cards and is currently in the process of joining the chassis or VCStack Plus.
	Syncing Firmware The Standby Control Fabric Card is running a different software release to the Active Control Fabric Card. This software is being automatically upgraded, so that the Control Fabric Card can fully join the chassis.
	Configuring The chassis configuration is currently being applied to the card.
	Syncing The Standby Control Fabric Card has just joined and is now configured, but it is still synchronizing dynamic protocol information from the active Control Fabric Card.
	Online The card is fully operational.
	Provisioned The slot is pre-configured for the insertion of a card at a later time.
In addition, the Control Fabric Cards will also display in brackets Active or Standby, depending on whether they are the Active or Standby Control Fabric Card.	

Related Commands **show provisioning (card)**
show system
show tech-support
stack management subnet

show card detail

Note This command can be found in the System Configuration and Monitoring Commands chapter.



Use this command to display detailed information about current and provisioned chassis, line cards, or control cards, and to display software version information.

Syntax show card detail

Mode Privileged Exec

Example To display detailed information about the cards, use the following command:

```
awplus# show card detail
```

Figure 5: Example output from the show card detail command

```
DUT2-x8100#show card detail
```

```
Card 1.1:
```

```
-----
Type           AT-SBx81GP24
State          Online
Uptime         -
Bootloader Version -
Mac Address    eccd.6d7b.3014
Software Version 5.4.4-1.2
```

```
Card 1.2:
```

```
-----
Type           AT-SBx81GT40
State          Online
Uptime         -
Bootloader Version -
Mac Address    eccd.6da3.e6b3
Software Version 5.4.4-1.2
```

```
Card 1.3:
```

```
-----
Type           -
State          -
Uptime         -
Bootloader Version -
Mac Address    -
Software Version -
```

```
Card 1.4:
```

```
-----
Type           -
State          -
Uptime         -
Bootloader Version -
Mac Address    -
Software Version -
```

```
Card 1.5:
```

Figure 5: Example output from the show card detail command (cont.)

```
Type                AT-SBx81CFC960
State               Online (Active)
Uptime              -
Bootloader Version  -
Mac Address         eccd.6d9e.330e
Software Version    5.4.4-1.2

Card 1.6:
-----
Type                AT-SBx81CFC960
State               Online (Standby)
Uptime              -
Bootloader Version  -
Mac Address         eccd.6d9e.3310
Software Version    5.4.4-1.2

Chassis management subnet address 192.168.255.0
```

Table 3: Parameters in the output of the show card detail command

Parameter	Description
Card	Chassis number and slot number where the card is installed.
Type	Product name of the card installed in the slot. If no card is installed, but one has been provisioned, then the provisioned board class is displayed, for example "ge24". If no card has been installed or provisioned then "-" is displayed.
State	The current state of the card. One of the following will apply:
	Booting The card is currently loading its software release.
	Initializing The card has loaded its software release and is currently initializing software processes.
	Joining The card is communicating with other cards and is currently in the process of joining the chassis.
	Syncing Firmware The Standby Control Fabric Card is running a different software release to the Active Control Fabric Card. This software is being automatically upgraded, so that the Control Fabric Card can fully join the chassis.
	Configuring The chassis configuration is currently being applied to the card.
	Syncing The Standby Control Fabric Card has just joined and is now configured, but it is still synchronizing dynamic protocol information from the Active Control Fabric Card.
	Online The card is fully operational.
	Provisioned The slot is pre-configured for the insertion of a card at a later time.
	In addition, the Control Fabric Cards will also display in brackets Active or Standby , depending on whether they are the Active or Standby Control Fabric Card.
Uptime	The time the card has been running for. If the card is not in the online state then "-" is displayed.
Bootloader Version	The version of the bootloader that the card has installed on it. If the card is not in the online state, then "-" is displayed.
Mac Address	The hardware MAC address of the card. If the card is not in the "Online" state then "-" is displayed.
Chassis management subnet address	Displays the stack management subnet address used by the chassis.

Related Commands

- show provisioning (card)**
- show system**
- show tech-support**
- stack management subnet**

show system

This command displays general system information about the device, including the hardware installed, memory, and software versions loaded. It also displays location and contact details when these have been set.

Note that this command will also display a warning message when ISSU is in progress.

For information on output options, see “Controlling “show” command output” in the Getting Started chapter.

Syntax show system

Mode User Exec and Privileged Exec

Usage Entering this command will display the information for the entire system. In a stacked configuration a heading will be displayed to distinguish the different information for each stack member.

Example To display configuration information, use the command:

```
awplus# show system
```

Output Figure 6: Example output from the show system command

```
swi_a_1350_1000#show system
Switch System Status                                     Tue Apr 15 13:26:13 2014
```

Board	ID	Bay	Board Name	Rev	Serial number
Chassis	315		AT-SBx8112	E-0	A042764112500072
Controller	316	Bay5	AT-SBx81CFC960	F-0	A042854111400005
Controller	316	Bay6	AT-SBx81CFC960	F-0	A042854112500015
Blade	317	Bay7	AT-SBx81GP24	C-0	A042774102900003
Blade	351	Bay12	AT-SBx81GT24	D-1	A044024112500020
PSU	320	PSUA	AT-SBxPWRPOE1/AC	A-0	-
PSU	319	PSUD	AT-SBxPWRSYS1/AC	A-0	-
Fan module	321	FAN1	AT-SBxPWRSYS1/AC	E-0	A042844112500016

```

RAM: Total: 512580 kB Free: 357016 kB
Flash: 126.0MB Used: 38.5MB Available: 87.5MB
-----
Environment Status : Normal
Uptime             : 1 days 00:48:55
Bootloader version : 2.0.9

Current software   : Software Version 5.4.4-1.1 or later
Software version   : SBx81CFC960-5.4.4-1.2.rel
Build date        : Mon Apr 14 11:43:54 NZST 2014

Warning: ISSU is currently in progress.
System may be running with different software versions

Current boot config: flash:/default.cfg (file exists)

System Name
awplus
System Contact

System Location
```

Related Commands show system environment

show version

This command displays the version number and copyright details of the current AlliedWare Plus™ OS your device is running.

The show output now displays a message whenever ISSU is running.

For information on output options, see “Controlling “show” command output” in the Getting Started chapter.

Syntax show version

Mode User Exec and Privileged Exec

Example To display the version details of your currently installed software, use the command:

```
awplus# show version
```

Output **Figure 7: Example output from the show version command**

```
awplus#show version
AlliedWare Plus (TM) 5.4.4 19/15/14 13:22:32
Build name : SBx81CFC960-5.4.4-1.2.rel*
Build date : Fri Jun 6 13:22:32 NZST 2014
Build type : RELEASE
* ISSU in progress - Run "show card detail" for more information
NET-SNMP SNMP agent software
(c) 1996, 1998-2000 The Regents of the University of California.
All rights reserved;
(c) 2001-2003, Networks Associates Technology, Inc. All rights reserved.
(c) 2001-2003, Cambridge Broadband Ltd. All rights reserved.
(c) 2003, Sun Microsystems, Inc. All rights reserved.
(c) 2003-2006, Sparta, Inc. All rights reserved.
(c) 2004, Cisco, Inc and Information Network
Center of Beijing University of Posts and Telecommunications.
All rights reserved.
RSA Data Security, Inc. MD5 Message-Digest Algorithm
(c) 1991-2, RSA Data Security, Inc. Created 1991. All rights reserved.
OpenSSL Library
Copyright (C) 1998-2011 The OpenSSL Project. All rights reserved.
Original SSLeay License
Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com).
sFlow(R) Agent Software
Copyright (c) 2002-2006 InMon Corp.
DHCP Library
Copyright (c) 2004-2012 by Internet Systems Consortium, Inc. ("ISC")
Copyright (c) 1995-2003 by Internet Software Consortium.
DHCP Bind
Copyright (c) 2005 - 2008, Holger Zuleger HZnet. All rights reserved.
Application Interface Specification Framework
Copyright (c) 2002-2004 MontaVista Software, Inc;
Copyright (c) 2005-2010 Red Hat, Inc.
Hardware Platform Interface Library
Copyright (c) 2004 by Intel Corp.
Copyright (C) IBM Corp. 2004-2008.
Corosync Cluster Engine
Copyright (c) 2002-2004 MontaVista Software, Inc. All rights reserved.
Copyright (c) 2005-2010 Red Hat, Inc. File Utility Library
Copyright (c) Ian F. Darwin 1986-1987, 1989-1992, 1994-1995.
Software written by Ian F. Darwin and others;
maintained 1994- Christos Zoulas.
ProL2TP
Copyright Katalix Systems Ltd, 2010, 2011.
All rights reserved.

Portions of this product are covered by the GNU GPL, source code may be
downloaded from: http://www.alliedtelesis.co.nz/support/gpl/awp.html
```

Related Commands **boot system backup**
show boot

type issu

This new command configures a trigger that will activate if the automatic phase of the ISSU process enters one of the following selectable states: upgraded, completed, or aborted.

Caution ISSU trigger scripts that use any type other than “ISSU Completed” must not place the switch into Configuration Mode.



Syntax `type issu [cfcs-upgraded|completed|aborted]`

Parameter	Description
cfcs-upgraded	Activates when the CFCs are upgraded, i.e. the automatic phase has completed.
completed	Activates when the ISSU process is completed.
aborted	Activates if the ISSU event (automatic phase) is aborted.

Mode Trigger Configuration

Related Commands `show trigger`
`trigger`

AMF Introduction and Configuration

Contents

Introduction to AMF.....	110
AMF Supported Products and Software Versions	110
Key Benefits of AMF.....	111
Unified Command-Line	111
Configuration Backup and Recovery	111
Rolling-Reboot Upgrade	111
Node Provisioning.....	112
AMF Terminology and Introduction	113
AMF Network.....	113
AMF Nodes	113
Node Licensing	113
Node Interconnection.....	114
AMF Domains	114
AMF Network Operational Concepts	116
Retention and Use of the 'Manager' Username	116
Working-Set	116
AMF Restricted-Login.....	117
Loop-Free Data Plane.....	117
Aggregators	117
VCStacks.....	117
AMF External Removable Media	117
AMF Interaction with QoS and ACLs.....	118
NTP and AMF	118
Configuring AMF	119
AMF Tunneling (Virtual Links)	125
Verifying the AMF Network	129
Configuring Multiple Nodes at the Same Time: the Unified CLI	131
Working-Set Groups	132
Executing Commands on Working-Sets.....	133
Interactive Commands.....	136
AMF Backups	137
Using External Media Storage	137
Performing a Manual Backup	138
Backing up to Remote Servers	142
Node Recovery	144
Automatic Node Recovery.....	144
Restoring a Node to a "Clean" State.....	145
Manual Node Recovery.....	146
Node Recovery on VCStacks	147
AMF Safe Configuration.....	148
Detecting AMF Safe Configuration Operation.....	148
AMF Safe Configuration Procedures.....	148
Undoing an AMF Safe Configuration.....	149
Rolling-Reboot Firmware Upgrade.....	151
Performing a Rolling-Reboot Upgrade	153
Node Provisioning	155

Introduction to AMF

The Allied Telesis Management Framework (AMF) is a suite of features that combine to simplify network management across all supported network switches from the core to the edge.

AMF also provides simplified switch recovery and firmware upgrade management. The primary function of AMF is to reduce the management and maintenance overhead on a network, while improving on responsiveness and handling of switch failures within the network.

This chapter provides a conceptual introduction to AMF together with its benefits, together with configuration guidelines showing how to use AMF in practical networks. For more information on the commands used in this chapter, see [“AMF Commands” on page 161](#).

AMF Supported Products and Software Versions

The following list shows which Allied Telesis switches are capable of running AMF and indicates those capable of operating as Master Nodes.

An AMF-Master feature license is required for each AMF master node in the AMF network. AMF-Master feature licenses are available for the SBx8100 and SBx908 platforms.

Table 1: AMF Nodal Capability by Switch Type

Switch Type	AMF Nodal Capability
SwitchBlade™ x8100	master or member
SwitchBlade™ x908	master or member
x900 series switches	member only
x610 series switches	member only
x510 series switches	member only
IX5-28GPX switches	member only
x310 series switches	member only
x230 series switches	member only
x210 series switches	member only
DC2552XS switch	member only

Key Benefits of AMF

The key benefits of AMF include its unified command-line, simple configuration backup and recovery process, and time-saving rolling firmware upgrade.

Unified Command-Line

The conventional means of configuring and controlling AlliedWare Plus (AW+) switches is to use their text-based command-line interface (CLI). In existing networks, the CLI is available via a serial console port and also to remote login sessions such as SSH.

AMF extends this capability from managing either a single switch to managing a whole network by using a single (unified) CLI session. Using the unified CLI, a network administrator can nominate all nodes or a subset of nodes within the AMF network to comprise an entity known as a “**working-set**”. Commands can then be executed concurrently across all switching nodes within the defined working-set as if they were a single unit. Any existing configuration or diagnostic actions can thus be applied to multiple devices using a single command sequence, thus reducing maintenance costs and configuration complexity, while still retaining complete flexibility in network design and control.

Multiple AMF networks can exist side by side across a single physical network. Note that AMF treats a Virtual Chassis Stack (VCSStack) as a single node.

Configuration Backup and Recovery

The **master** nodes use external storage to automatically backup the complete configuration information for all their member nodes, including boot configuration, firmware, licenses, and user scripts.

If an AMF member node should fail, the AMF process will automatically recognize and reconfigure an unconfigured replacement (standby) unit, completely recreating the stored configuration of the failed unit into the replacement unit. The new unit will then reboot and resume service, without any need for user intervention beyond physical hardware replacement and cable connection. In this way AMF provides a complete zero-touch recovery solution. For more information, see “[Configuring Multiple Nodes at the Same Time: the Unified CLI](#)” on page 131.

Rolling-Reboot Upgrade

Installing Firmware upgrades on a production network is typically an infrequent but sensitive and labor-intensive process. AMF is able to roll-out upgrades to a user-selected subset of nodes. All that needs to be entered is the target group of nodes, and the location where the new firmware is stored; AMF will then take care of the rest. Nodes are upgraded in a serial fashion, with each node tested before continuing the upgrade on the next node.

If an upgrade fails on a particular node, the upgrade process is automatically terminated and that node will revert to its previous firmware version. In this way firmware updates are almost completely hands-free, whilst also providing confidence that a bad update will not result in loss of service. For more information, see “[Performing a Rolling-Reboot Upgrade](#)” on page 153.

Node Provisioning

It is generally undesirable to have unconfigured devices connected to the network. Node provisioning enables you to preconfigure a port ready to accept and automatically configure a “clean” (as new) device for connection at a later date. This is achieved by storing the future node's configuration in the master node's backup files ready to be loaded to the new device when connected.

AMF Terminology and Introduction

This section contains a glossary of terminology used to describe AMF networking.

AMF Network

Conceptually an AMF network is a collection of interconnected network switch nodes. This interconnection in turn comprises a hierarchy of network domains. These terms are explained in more detail later in this chapter.

Network name Because networks are able to interconnect, an AMF network *name* is necessary to identify the AMF network to which any given node belongs. It follows therefore, that all nodes within a single AMF network must be configured with the same AMF network name.

AMF Nodes

Two types of nodes exist within an AMF network, Master Nodes and Member Nodes. Either type can comprise either a single switch, or a VCStack.

Master Nodes Master nodes are user defined by configuration. They then form the core domain of the AMF network. Aspects of master node functionality include:

- performing file system backups of all nodes in the AMF network.
- providing an essential component for the formation of an AMF network. That is, an AMF network cannot exist without the existence of at least one master node.
- at least one master node must be present for an AMF network to exist.

When more than one AMF master node exists in an AMF network, their operation is completely independent and unsynchronized.

Member Nodes AMF member nodes are referred to simply as nodes.

Node Licensing

Master node License AMF master nodes are supported on selected switch platforms: an AMF license is required for each master. For a list of node capability against specific switch types, see [Table 1 on page 110](#)

Only one AMF master license is required even if two CFCs (Controller Fabric Cards - for SBx8100 only) are installed. The license is for the chassis, not the CFC.

A VCStack needs to have consistent licensing on all stack members. Therefore, an AMF master license would be required on both devices in an SBx908 stack.

When more than one AMF master node exists in an AMF network, it is important to know that these operate completely independently of each other, and there is no synchronization between AMF master nodes.

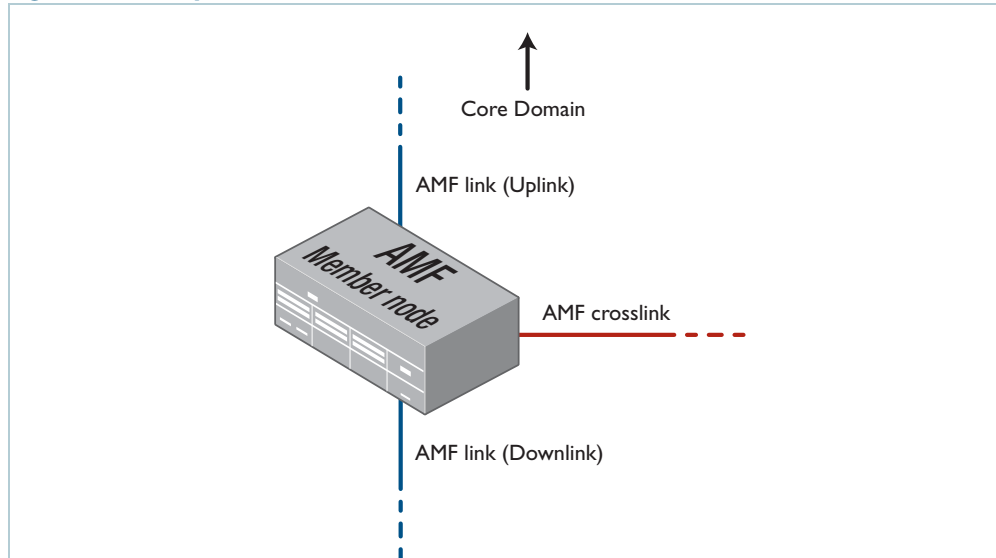
For redundancy, an AMF network can have multiple master nodes, each acting as a master for the network. However, there is no synchronization of status or data files between the masters. The behavior of a master node is not changed at all by the presence of other master nodes.

Core distance This is the distance (hop count) between a particular domain and its Core domain. The Core domain has a Core distance of 0, and the maximum recommended Core distance in an AMF network is 8.

Node Interconnection

Nodes can connect either horizontally using crosslinks, or vertically using Uplinks/Downlinks. This is shown in the illustration below:

Figure 1: AMF Uplinks, Downlinks, and Crosslinks



AMF links, of either type, are used to pass AMF management traffic between nodes; however, they can also carry other network traffic. Configuring an interface as an **AMF-link** will automatically put the port into trunk mode. An AMF link can be either a single link or a static aggregator. For more information on trunk mode see **“Configuring VLANs”** in the “VLAN Introduction” chapter in your switch’s Software Reference.

Crosslinks AMF crosslinks are used to connect AMF nodes to other AMF nodes within what is termed an AMF Domain. Configuring an interface as an AMF-crosslink will automatically put its port into trunk mode. A crosslink can be either a single link or a static aggregator.

AMF master nodes must be connected using AMF crosslinks to ensure they are part of the uppermost domain level.

Up/Down Links Uplinks/Downlinks interconnect domains in what is a vertical hierarchy. The highest domain is the core domain.

AMF Domains

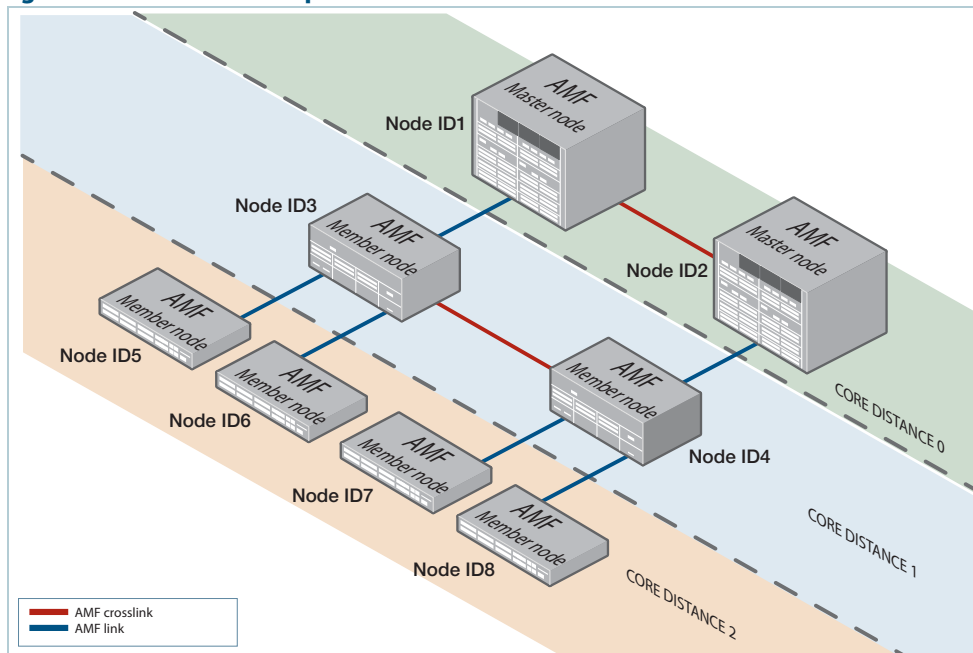
Every AMF node belongs to an AMF domain. Domains can comprise of a single node or multiple nodes. AMF master nodes are included in highest domain level, sometimes called the core domain, and all other domains are rooted in this domain.

As previously mentioned, AMF domains are determined by AMF crosslinks, (see **“Working-Set” on page 116**). All nodes connected via AMF crosslinks form part of the same domain, and nodes connected via regular AMF links will be part of either higher or lower level domains.

Nodes within a domain must be connected in either a chain or ring topology. This means that a maximum of two crosslinks should be configured on any single node. The advantage of an AMF domain is that two links from a domain to a single higher level domain will provide redundant AMF links. We recommend that an AMF domain should only be connected to a single higher level domain, though it may be connected to multiple lower level domains. We also recommend that you set a maximum number of 12 nodes per domain.

Hop-Count The vertical distance of a domain from the core domain is known as its Hop-Count. The illustration **“Core distance hop-counts between domains” on page 115** shows the relationship between nodes, domains and core distance (hop-count).

Figure 2: Core distance hop-counts between domains



Node provisioning Node provisioning enables you to configure a node before it is physically present in the AMF network. When the node is eventually connected to an expectant port, it will automatically set itself up with the previously stored configuration files and release.

AMF Network Operational Concepts

Retention and Use of the 'Manager' Username

The default **username** for an AlliedWare Plus login is "manager", with a documented default **password**. Users should change this password on all their nodes to provide login security.

It is possible to add new usernames and passwords to nodes, but to retain the ability to centrally manage the network, usernames should be uniformly configured across all AMF nodes within the AMF network.

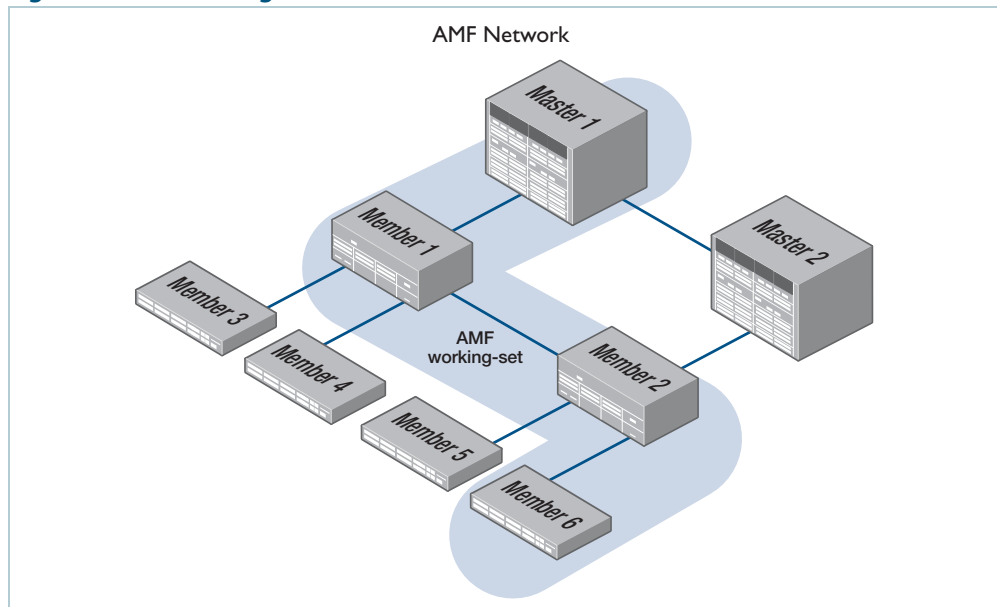
Note that managing a network with AMF is incompatible with user authentication via RADIUS or TACACS+. Use the normal local database for user authentication.

Working-Set

Conceptually a working set is a collection of switches that can then be configured centrally as if there were a single device. A working set may comprise a pre-defined group that has been automatically created based on some common set of physical attributes such as switch type etc, or it may be created by a network user for ease of configuration.

Specifying or selecting a working-set allows CLI commands to be executed on all nodes within the selected working-set with a single command. A working-set can be defined, selected and configured from any node within an AMF network. The illustration "[AMF working-set](#)" on page 116 shows a number of switches which comprise a working set.

Figure 3: AMF working-set



AMF Restricted-Login

By default, a user logged into any node on an AMF network is able to manage any other node by using either working-sets or atmf remote login (provided the login username exists on all nodes). Where the access provided by this feature is too wide, or contravenes network security restrictions, this access can be limited by running the command **“*atmf restricted-login*”** on page 207. This command will not be saved in the running configuration; it is a network property that can be enabled or disabled from any ATMF master. The status of restricted-login will be retained over a reboot.

When restricted login is enable on the network, only the ATMF Master nodes are able to create working-sets or manage other devices via atmf remote-logins. Other nodes may remote login to the ATMF Master, but they will require password authentication on that master, and will then be able to create working-sets originating from the Master.

Note that once you have run this command, certain other commands that utilize the AMF working-set command, such as the **include**, **atmf reboot-rolling** and **show atmf group members** commands, will operate only on master nodes.

Loop-Free Data Plane

The current version of AMF does not control the data plane, so it is a requirement that the network is configured such that the data plane (i.e. the paths defined by the data VLANs) is kept loop free.

Aggregators

Dynamic Aggregators (LACP) cannot be used on ports configured as AMF links or cross-links. Therefore any aggregated links in an AMF network need to be configured as static aggregators.

VCStacks

If any VCStacks are included as AMF nodes it is a requirement that the *VCS virtual MAC* feature is enabled to ensure correct operation of the AMF network. If the VCStack is running as an AMF master node and backup is required, then removable external storage media should be installed in both stack members.

AMF External Removable Media

In order to maintain a recovery capability, all AMF master nodes require external storage media installed, such as a USB or SD card. This external storage is used to hold a backup of all relevant files from all nodes within the AMF network, including other master nodes, so it must be large enough to accommodate all of the backed up files. Files that are backed up include all configuration files, release files, and scripts, but not core dumps, exception logs, or technical support files.

Typically a 4GB capacity external media device would be of sufficient size to hold backups for a 40 node AMF network.

When using Dual CFCs (Controller Fabric Card) in a SBx8100, a memory stick is required in both CFCs.

AMF Interaction with QoS and ACLs

It's important that ACL and QoS rules do not block any traffic on VLANs 4091 and 4092 because they are the default AMF control VLANs. Similarly, ACL and QoS rules should not block any Layer 3 traffic on 172.31.0.* or 172.31.128.* these being the default AMF management traffic subnets. Packets with protocol type 0xfbae and BPDU packets that use the MAC address: 0180.c200.002e should also not be blocked.

Note The AMF control VLANs and AMF management subnets can be manually changed.



NTP and AMF

AMF uses NTP to synchronize the system clocks across nodes within the network. For this to operate, one or more external NTP servers must be configured on the network, and every node on the network must be configured to use the external server or servers.

Alternatively, you can configure an AlliedWare Plus device as the NTP master, but this NTP master must not be a member of the AMF network. Otherwise, NTP synchronisation issues can occur.

To configure an AlliedWare Plus device as an NTP master, use the command:

```
awplus(config)# ntp master 11
```

The primary function of NTP within an AMF network is to ensure that time and date stamps on backups are consistent across member nodes within the backup. This is particularly important in an AMF network that has multiple AMF master nodes, to ensure that node recovery is performed with the most up-to-date backup.

Configuring NTP on the AMF network

Before you configure NTP on the AMF network, we recommend setting all nodes in the network to the same time, date, and timezone, to ensure NTP synchronisation. To do this, create an AMF working-set of the whole network and set the date and time, for example:

```
awplus(config)# atmf working-set group all
awplus(config)# clock set 16:47:00 11 Sep 2014
awplus(config)# clock timezone utc plus 12
```

Once you have configured all nodes with the same time, date and timezone, configure the working-set of all nodes with the IP address of the NTP server, for example:

```
awplus(config)# ntp server 172.31.0.1
```

You can then check that the nodes have synchronised with the NTP server using the **show ntp status** command, for example:

```
awplus# show ntp status
```

```
awplus#show ntp status
Clock is synchronized, stratum 13, reference is 172.31.0.1
actual frequency is 7.1420 PPM, precision is 2**-18
reference time is d7bba834.19f1a68f (16:48:52.101 utc Thu Sep 11 2014)
clock offset is -1.286 msec, root delay is 2.237 msec
root dispersion is 45.213 msec
```

Configuring AMF

The following configuration example uses a simplified network to explain the steps required to configure AMF.

Figure 4: Simple AMF single master example

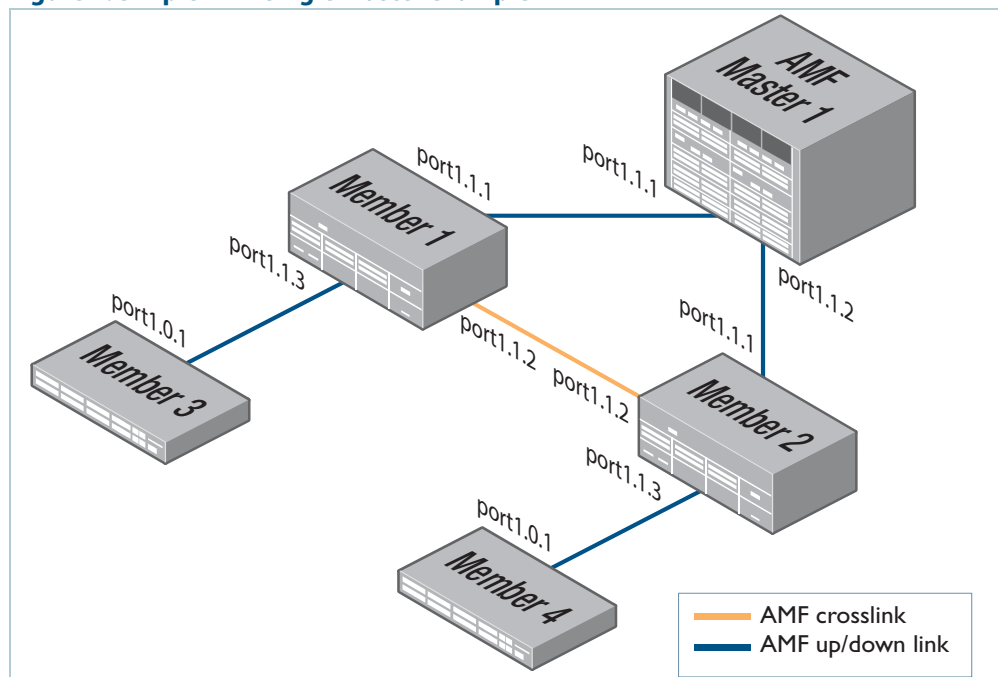


Table 2: Configure the AMF master node

Description	Prompt	Command
Step 1. Set the host name.		
Enter Global Configuration mode	(awplus#)	configure terminal
Set the host name	awplus(config)#	hostname AMF_Master
Note that host names are used as the AMF node name and MUST BE UNIQUE within the AMF network.		
Step 2. Set the AMF network name.		
Set the AMF network name.	AMF_Master(config)#	atmf network-name atmf1
Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <i>rebooted</i> before the AMF network name takes effect.		
Step 3. Configure the switch to be the AMF master.		
	AMF_Master(config)#	atmf master
An AMF network must have at least one master configured. A license is required for each AMF master in the AMF network. If an AT-SBx8100 with dual CFCs is configured as an AMF master a license is only required on the CFC master, as the license will be synchronized across CFCs. If an AT-SBx908 is configured as an AMF master, a license is required to be installed on both stack members.		
Step 4. Configure the data VLANs.		
	AMF_Master(config)#	vlan database
	AMF_Master(config-vlan)#	vlan 2-3
Step 5. Configure ports as AMF-links.		
	AMF_Master(config)#	interface port1.1.1-1.1.2
	AMF_Master(config-if)#	switchport atmf-link
Step 6. Configure data VLANs on AMF-links as required.		
	AMF_Master(config-if)#	switchport trunk allowed vlan add 2-3
Step 7. Save the configuration and reboot the switch.		
	AMF_Master#	copy running-config startup-config
Building configuration...[OK]		
	AMF_Master#	reload
Are you sure you want to reboot the whole chassis? (y/n): y		

Table 3: Configure the first member node (Member1)

Description	Prompt	Command
Step 1. Set the host name.		
Enter Global Configuration mode	(awplus#)	configure terminal
Set the host name	awplus(config)#	hostname Member1
Note that host names are used as the AMF node name and MUST BE UNIQUE within the AMF network.		
Step 2. Set the AMF network name.		
Set the AMF network name to atmf1.	Member1(config)#	atmf network-name atmf1
Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <i>rebooted</i> before the AMF network name takes effect.		
Step 3. Configure the data VLANs.		
Enter the VLAN Configuration mode	Member1(config)#	vlan database
Create VLANs 2 and 3	Member1(config-vlan)#	vlan 2-3
Step 4. Configure ports as AMF-links.		
Enter Interface Configuration mode for ports 1.1.1 to 1.1.3	Member1(config)#	interface port1.1.1-1.1.3
Configure these ports as AMF links	Member1(config-if)#	switchport atmf-link
Step 5. Configure data VLANs on the AMF-links as required.		
Set VLANs 2 to 3 to be data VLANs	Member1(config-if)#	switchport trunk allowed vlan add 2-3
Step 6. Configure AMF-crosslink.		
Enter the Interface Configuration mode for port 1.1.2	Member1(config)#	interface port1.1.2
Set this port to be an AMF-crosslink	Member1(config-if)#	switchport atmf-crosslink
	Member1(config-if)#	switchport trunk native vlan none
Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.		
Step 7. Save the configuration and reboot the switch.		
	Member1#	copy running-config startup-config
Building configuration...[OK]		
	Member1#	reload
Are you sure you want to reboot the whole chassis? (y/n):		y

Table 4: Configure the first member node (Member2)

Description	Prompt	Command
Step 1. Set the host name.		
Enter Global Configuration mode	awplus#)	configure terminal
Set the host name	awplus(config)#	hostname Member2
Note that host names are used as the AMF node name and MUST BE UNIQUE within the AMF network.		
Step 2. Set the AMF network name.		
Set the AMF network name to atmf1.	Member2(config)#	atmf network-name atmf1
Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <i>rebooted</i> before the AMF network name takes effect.		
Step 3. Configure the data VLANs.		
Enter the VLAN Configuration mode	Member2(config)#	vlan database
Create VLANs 2 and 3	Member2(config-vlan)#	vlan 2-3
Step 4. Configure ports as AMF-links.		
Enter Interface Configuration mode for ports 1.1.1 to 1.1.3	Member2(config)#	interface port1.1.1-1.1.3
Configure these ports as AMF links	Member2(config-if)#	switchport atmf-link
Step 5. Configure data VLANs on the AMF-links as required.		
Set VLANs 2 to 3 to be data VLANs	Member2(config-if)#	switchport trunk allowed vlan add 2-3
Step 6. Configure AMF-crosslink.		
Enter the Interface Configuration mode for port 1.1.2	Member2(config)#	interface port1.1.2
Set this port to be an AMF-crosslink	Member2(config-if)#	switchport atmf-crosslink
	Member2(config-if)#	switchport trunk native vlan none
Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.		
Step 7. Save the configuration and reboot the switch.		
	Member2#	copy running-config startup-config
Building configuration...[OK]		
	Member2#	reload
Are you sure you want to reboot the whole chassis? (y/n):		y

Table 5: Configure the first member node (Member3)

Description	Prompt	Command
Step 1. Set the host name.		
Enter Global Configuration mode	(awplus#)	configure terminal
Set the host name	awplus(config)#	hostname Member3
Note that host names are used as the AMF node name and MUST BE UNIQUE within the AMF network.		
Step 2. Set the AMF network name.		
Set the AMF network name to atmf1.	Member3(config)#	atmf network-name atmf1
Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <i>rebooted</i> before the AMF network name takes effect.		
Step 3. Configure the data VLANs		
Enter the VLAN Configuration mode	Member3(config)#	vlan database
Create VLANs 2 and 3	Member3(config-vlan)#	vlan 2-3
Step 4. Configure ports as AMF-links.		
Enter Interface Configuration mode for ports 1.0.1 to 1.0.3	Member3(config)#	interface port1.0.1-1.0.3
Configure these ports as AMF links	Member3(config-if)#	switchport atmf-link
Step 5. Configure data VLANs on the AMF-links as required.		
Set VLANs 2 to 3 to be data VLANs	Member3(config-if)#	switchport trunk allowed vlan add 2-3
Step 6. Configure AMF-crosslink.		
Enter the Interface Configuration mode for port 1.0.2	Member3(config)#	interface port1.0.2
Set this port to be an AMF crosslink	Member3(config-if)#	switchport atmf-crosslink
	Member3(config-if)#	switchport trunk native vlan none
Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.		
Step 7. Save the configuration and reboot the switch.		
	Member3#	copy running-config startup-config
Building configuration...[OK]		
	Member3#	reload
Are you sure you want to reboot the whole chassis? (y/n):		y

Table 6: Configure the first member node (Member4)

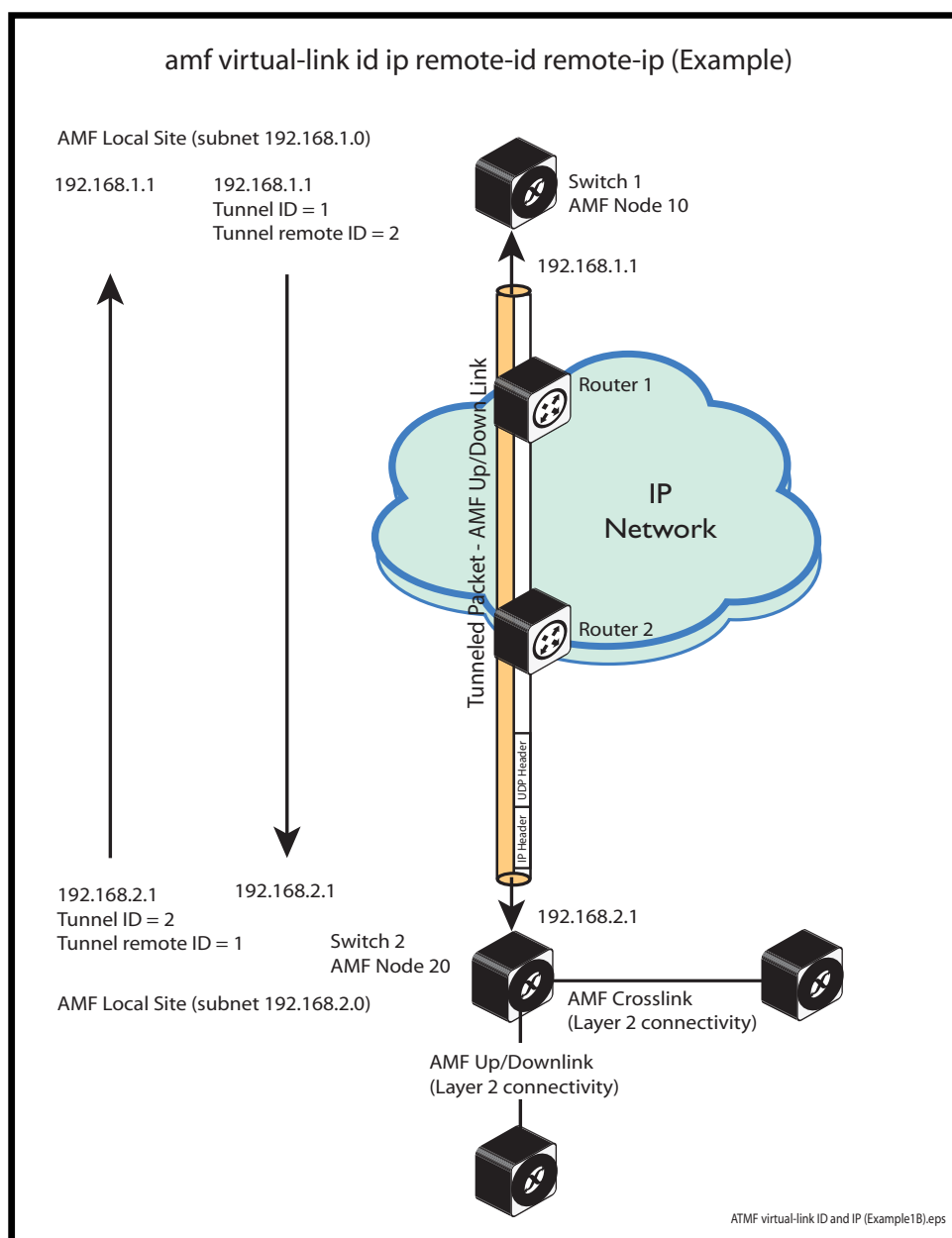
Description	Prompt	Command
Step 1. Set the host name.		
Enter Global Configuration mode	(awplus#)	configure terminal
Set the host name	awplus(config)#	hostname Member4
Note that host names are used as the AMF node name and MUST BE UNIQUE within the AMF network.		
Step 2. Set the AMF network name.		
Set the AMF network name to atmf1.	Member4(config)#	atmf network-name atmf1
Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <i>rebooted</i> before the AMF network name takes effect.		
Step 3. Configure the data VLANs.		
Enter the VLAN Configuration mode	Member4(config)#	vlan database
Create VLANs 2 and 3	Member4(config-vlan)#	vlan 2-3
Step 4. Configure ports as AMF-links.		
Enter Interface Configuration mode for ports 1.0.1 to 1.0.3	Member4(config)#	interface port1.0.1-1.0.3
Configure these ports as AMF links	Member4(config-if)#	switchport atmf-link
Step 5. Configure data VLANs on the AMF-links as required.		
Set VLANs 2 to 3 to be data VLANs	Member4(config-if)#	switchport trunk allowed vlan add 2-3
Step 6. Configure AMF-crosslink.		
Enter the Interface Configuration mode for port 1.0.2	Member4(config)#	interface port1.0.2
Set this port to be an AMF crosslink	Member4(config-if)#	switchport atmf-crosslink
	Member4(config-if)#	switchport trunk native vlan none
Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.		
Step 7. Save the configuration and reboot the switch.		
	Member4#	copy running-config startup-config
Building configuration...[OK]		
	Member4#	reload
Are you sure you want to reboot the whole chassis? (y/n):		y

AMF Tunneling (Virtual Links)

AMF Tunneling enables you to extend your local uplinks and downlinks across a wide area network. The tunneled data is then wrapped in a Layer 3 IP packet for transmission across a wide area IP network. A simple AMF tunnel is shown in **“AMF virtual link” on page 125**. Switches 1 and 2 encapsulate the Layer 2 AMF uplink and downlink data and wrap this inside a Layer 3 IP packet to enable it to traverse an IP Network. Routers 1 and 2 (and any other routers within the cloud) perform a conventional routing function, reading the IP addresses of the tunneled packets and forwarding them to their destination.

Once connected through the tunnel, the remote AMF members will have the same AMF capabilities as a directly connected AMF member.

Figure 5: AMF virtual link



Configuring a virtual link

The Layer 2 tunnel created by the command **atmf virtual-link id ip remote-id remote-ip command on page 208** enables a local AMF session to appear to pass transparently across a Wide Area Network (WAN) such as the Internet. The addresses configured as the local and remote tunnel IP addresses must have IP connectivity to each other. If the tunnel is configured to connect a head office and branch office over the Internet, typically this would involve using some type of managed WAN service such as a site-to-site VPN. Tunnels are only supported using IPv4.

Configuration involves creating the following:

- local tunnel ID
- local IP address
- remote tunnel ID
- remote IP address

A reciprocal configuration is also required on the corresponding remote device. The local tunnel ID must be unique to the device on which it is configured.

The tunneled link may operate via external (non AlliedWare Plus) routers in order to provide wide area network connectivity. However, in this configuration, these devices perform a conventional router-to-router connection. The protocol tunneling function is accomplished by the AMF nodes.

Note that the requirement to preconfigure the local IP address and tunnel ID on a device located at the far end of an AMF virtual-link tunnel means that zero touch device replacement cannot be achieved on a remote device that terminates the tunnel.

Example Use the following command to create the tunnel shown in figure **Figure 5 on page 125**.

```
Host-A(config)# atmf virtual-link id 1 ip 192.168.1.1
                  remote-id 2 remote-ip 192.168.2.1

Host-B(config)# atmf virtual-link id 2 ip 192.168.2.1
                  remote-id 1 remote-ip 192.168.1.1
```

Caution



On an IP interface that is carrying ATMF virtual link traffic, do not set the MTU (Maximum Transmission Unit) below its default value of 1500 bytes.

Prioritizing the tunneled traffic

On the switch that interfaces to the wide area network router, we advise that you prioritize the tunneled traffic directed to the CPU over other CPU-bound user data. You can achieve this by allocating a higher Class of Service (CoS) tag to tunnel traffic than other traffic. The following configuration example shows an appropriate method. In the following configuration example, the virtual link traffic is between IP addresses 192.168.1.1 (on Host-A) and 192.168.2.1 (on Host-B). This connection is mapped to VLAN 10.

Note that the following process will prioritize the AMF traffic only within Switch 1 and Switch 2. To prioritize the tunneled AMF data across the IP network would require applying Layer 3 QoS by applying a DSCP (Differentiated Services Code Point) priority at the network boundary (Router 1 and Router 2) and ensuring that these priority levels are managed throughout the wide area network. Applying and managing QoS through the wide area network is outside the scope of this document.

Virtual link - configuration example

This example is based on the network shown in the illustration **Figure 5 on page 125**.

In this example, the virtual link traffic flows between 192.168.1.1 at the local end and 192.168.2.1 at the remote end. Subnet 192.168.1.1 exists on vlan10. Note that because this policy is being applied to incoming traffic, the switch IP address should match destination address in the ACL.

Figure 6: Prioritizing the tunneled traffic - Configured on Switch 1, Host-A

```
atmf virtual-link id 1 ip 192.168.1.1 remote-id 2 remote-ip
192.168.2.1
[...]

mls qos enable
access-list hardware vlink
 permit ip 192.168.2.1/32 ip 192.168.1.1/32
!
class-map vlink
 match access-group vlink
!
class-map vlinkarp
 match eth-format ethii-any protocol 0806
 match vlan 10
!
policy-map vlink
 class default
 class vlink
  remark new-cos 4 both
 class vlinkarp
  remark new-cos 4 both
!
[...]
!
interface port1.0.10
 switchport
 switchport mode access
 switchport access vlan 10
 service-policy input vlink
!
[...]
interface vlan10
 ip address 192.168.1.1/24
!
```

Table 7: Set QoS CoS for an AMF tunneling switch

Description	Prompt	Command
Step 1. Create VLAN 10.		
Enter Global Configuration mode	(Host-A#)	configure terminal
Enter VLAN config mode	Host-A(config)#	vlan database
Create and enable VLAN 10	Host-A(vlan-config)#	vlan 10 name virtual-link state enable
Step 2. Configure VLAN10		
Enter the VLAN configuration mode for VLAN10.	Host-A(vlan-config)#	interface vlan10
Set the IP address for VLAN10 to be 192.168.1.1/24	Host-A(vlan-config-if)#	ip address 192.168.1.1/24

Table 7: Set QoS CoS for an AMF tunneling switch(cont.)

Description	Prompt	Command
Return to config mode	Host-A(config-if)#	exit
Step 3. Add policy map vlink to port 1.0.10		
Set port 1.0.10 for configuring	Host-A(config)#	interface port 1.0.10
Set the port to access mode	Host-A(config-if)#	switchport mode access
Associate the port with VLAN10	Host-A(config-if)#	switchport access vlan10
Add policy map vlink to port 1.0.10	Host-A(config-if)#	service-policy input vlink
Return to config mode	Host-A(config-if)#	exit
Step 4. Create an AMF virtual-link tunnel		
Create the virtual link tunnel	Host-A(config)#	atmf virtual-link id 1 ip 192.168.1.1 remote-id 2 remote-ip 192.168.2.1
Step 5. Create an ACL to permit tunneled traffic		
Enable QoS on switch 1	Host-A(config)#	mls qos enable
Create an access-list for the virtual link	Host-A(config)#	access-list hardware vlink
Permit traffic that has the tunneled IP addresses	Host-A(config-ip-hw-acl)#	permit ip 192.168.2.1/32 ip 192.168.1.0/32
Step 6. Create a class-map for the virtual link		
Create a class-map named vlink	Host-A(config)#	class-map vlink
Step 7.		
Create a class-map named vlinkarp	Host-A(config)#	class-map vlinkarp
	Host-A(config-cmap)#	match eth-format ethii-any protocol 0806
Ensure vlinkarp packets on vlan10 are also sent to the CPU		match vlan10
Step 8.		
	Host-A(config)#	policy-map vlink
		match access-group
	Host-A(config-pmap)#	class default
Send vlink traffic to CoS queue 6		class vlink remark new-cos 4 both
Send vlinkarp traffic to CoS queue 6		class vlinkarp remark new-cos 4 both

Verifying the AMF Network

To check that all nodes have joined the AMF network use the [show atmf command on page 218](#) with the summary parameter. You can run this command from any node in an AMF network.

Figure 7: Checking AMF configuration using the show atmf summary command

```
AMF_Master#show atmf summary
ATMF Summary Information:
ATMF Status           : Enabled
Network Name          : atmf1
Node Name             : AMF_Master
Role                  : Master
Current ATMF Nodes    : 5
AMF_Master#
```

The **Current AMF Nodes** field in the output above shows that all 5 nodes have joined the AMF network.

Use the [show atmf nodes command on page 242](#) with the nodes parameter, to check information on individual nodes:

Figure 8: Output from the show atmf nodes command

```
AMF_Master#show atmf nodes
Node Information:
* = Local device
SC = Switch Configuration:
C = Chassis  S = Stackable  N = Standalone
Node          Device      ATMF      SC   Parent      Node
Name          Type        Master    Depth
-----
* AMF_Master   AT-SBx81CFC400    Y        C    none        0
Member1       SwitchBlade x908    N        S    AMF_Master   1
Member2       SwitchBlade x908    N        S    AMF_Master   1
Member4       x510-52GTX      N        S    Member2      2
Member3       x510-52GTX      N        S    Member2      2
Current ATMF node count 5
```

Note that the *Parent* field in the output above refers to the parent *domain* and not the upstream device. In the example output above, Member2 is the domain controller for the parent domain for Member3 and Member4.

Use the **show atmf links command on page 229** to check information on individual AMF links:

Figure 9: Checking output with the show atmf links command

```
switch1# show atmf links
```

ATMF Links Brief:

Local Port	Link Type	Port Status	ATMF State	Adjacent Node	Adjacent Ifindex	Link State
sa1	Crosslink	Up	TwoWay	Building_1	4501	Forwarding
1.1.1	Downlink	Up	Full	Bld1_Floor_1	5001	Forwarding
1.1.2	Downlink	Up	Full	Bld1_Floor_2	5003	Forwarding
1.1.3	Downlink	Up	Full	Bld2_Floor_1	6101	Forwarding
1.1.4	Crosslink	Down	Init	*switch3		Blocking

* = provisioned

Configuring Multiple Nodes at the Same Time: the Unified CLI

The unified CLI is a central component of AMF. It provides you with a configuration and display interface that can control a selected collection of nodes, or the entire AMF network, from a single point. This control is provided through the **atmf working-set** command.

The working-set

An AMF working-set is a set of nodes that can be collectively configured from a single device. Working sets can either **arbitrarily user defined** or **automatically created** (a pre-defined working-set). Specifying or selecting a working-set enables CLI commands to be executed on all nodes within the working-set by using a single command. A working-set can be defined, selected, and configured from any node within an AMF network.

Note For security reasons you can limit the action of working sets by applying "restrictive login." For more information, see **"atmf restricted-login" on page 207**



By default, when you first log into a node that is part of an AMF network, you are implicitly placed into the working-set group **local**, a working-set that contains only the local node. In this instance the CLI prompt when you log in will be either:

- the host-name, if one has been assigned, or
- in the case of a new node in safe mode, a host name based on its MAC address followed by the usual prompt (> or #)

```
Node1> enable
Node1#
```

To create a working set containing a set of nodes use the command **atmf working-set** followed by a comma separated list of the nodes you wish to control. Whenever you select a working set containing any nodes other than the local device, the CLI prompt will display the AMF network name, followed by the number of nodes contained in the working set in square brackets (**atmf1[2]** in the following example).

```
Node1# atmf working-set Node1,Node2
Node1,Node2
Working set join
atmf1[2]#
```

To return to just controlling the local device from any other working set, use the command **atmf working-set group local**.

Working-Set Groups

AMF contains the ability to have working-set groups, so that it is not always necessary to use a comma separated list to specify a working-set.

AMF working-set groups can be split into two types:

- Automatic
- User-defined

Automatic working-set groups

There are three automatic working-set groups that will exist on every AMF network:

1. *All*—all nodes within the AMF network.
2. *Current*—the current working-set of nodes. This group is useful for adding additional nodes to the current working-set.
3. *Local*—the local device

In any AMF network there will also be a number of other automatic working-set groups that are dependent on the platform types which exist within the network. To see the platform dependent automatic working-set groups that exist on the AMF network use the command **show atmf group** with the automatic parameter:

```
x908_VCS_1#show atmf group members automatic

Retrieving Automatic groups from:
x510_1 Master x908_VCS_2 x908_VCS_1

ATMF Group membership

Automatic      Total
Groups         Members  Members
poe            1       Master
x510           1       x510_1
SBx8100        1       Master
x900           2       x908_VCS_2 x908_VCS_1
```

To select a working-set group use the **atmf working-set** command with the group parameter, followed by the group name. You can specify a single group, a comma-separated list of groups, or a comma-separated list of individual nodes followed by a comma-separated list of groups:

```
x908_VCS_1# atmf working-set x510_1,x510_2 group x900
x510_1, x510_2, x908_VCS_1, x908_VCS_2
Working set join
atmf1[4]#
```

If you specify a partially invalid working-set node list or group list, only the valid nodes or groups will join the working set. If you specify a completely invalid working-set, you will create a working-set containing no nodes. The switch will generate a warning message to alert you that the current working-set is empty:

```
atmf1[3]# atmf working-set group x511

% Warning - working set is now empty

atmf1[0]#
```

User-defined working-set groups

In addition to the automatic working-set groups, you can create user-defined groups for arbitrary sets of nodes that you wish to group together, for example, all AMF master nodes.

To create a user-defined working-set group:

1. Create a working-set containing the desired nodes.
2. In global configuration mode use the command **“atmf group (membership)”** on [page 179](#).

```
Master# atmf working-set Master1,Master2

Master1,Master2

Working set join

atmf1[2]# conf t

atmf1[2]# atmf group new-group-name
```

You can see all user-defined working-set groups that exist on the AMF network with the command **“show atmf group members”** on [page 228](#):

```
x908_VCS_1#show atmf group members user-defined
```

```
Retrieving Automatic groups from:
x510_1 Master1, Master2, x908_VCS_2 x908_VCS_1
```

```
ATMF Group membership
```

User-defined Groups	Total Members	Members
Masters	2	Master1 Master2

```
Master#
```

Executing Commands on Working-Sets

Executing commands on a working-set of nodes is very similar to executing commands on a single AlliedWare Plus device.

When a command is executed that is valid for all nodes within the working-set, the output is displayed for each of the nodes separately. However, output will be grouped when it is the same for more than one node.

Here is an example output of the **show arp** command run from a working-set:

```
atmf1[4]#show arp
```

```
=====
```

```
Master:
```

```
=====
```

IP Address	MAC Address	Interface	Port	Type
172.31.0.1	eccd.6d7d.a542	ATMF	sa1	dynamic
172.31.0.3	0000.cd2b.0329	ATMF	sa1	dynamic
172.31.0.10	0000.cd37.0163	ATMF	sa1	dynamic

```
=====
```

```
x510_1:
```

```
=====
```

IP Address	MAC Address	Interface	Port	Type
172.31.0.2	eccd.6d03.10f9	ATMF	sa4	dynamic

```
=====
```

```
x908_VCS_1:
```

```
=====
```

IP Address	MAC Address	Interface	Port	Type
172.31.0.2	0000.cd37.1050	ATMF	sa1	dynamic

```
=====
```

```
x908_VCS_2:
```

```
=====
```

IP Address	MAC Address	Interface	Port	Type
172.31.0.2	0000.cd37.1050	ATMF	sa3	dynamic

```
atmf1[4]#
```

Invalid working-set commands

Some commands can only be executed on *certain* nodes within the working-set. In this case the command will be attempted on all nodes within the working-set. For any node for which the command is not valid, the command execution will fail and the output displayed will indicate the nodes on which the command succeeded and nodes on which the command failed.

Below is example output from the **show card** command run from a working-set, which is only a valid command for the SBx8100 series switches.

```

atmf1[4]# show card
=====
Master:
=====

Slot Card Type          State
-----
1    AT-SBx81GP24       Online
2    AT-SBx81GP24       Online
3    AT-SBx81GP24       Online
4    AT-SBx81XS6        Online
5    AT-SBx81CFC400     Online (Active)
6    -                  -
7    -                  -
8    -                  -
9    -                  -
10   -                  -
11   -                  -
12   -                  -
-----

=====
x510_1, x908_VCS_1, x908_VCS_2:
=====
% Invalid input detected at '^' marker.

```

Sub-configuration limitations for some nodes in a working-set

There will be some instances where a sub-configuration mode is only valid for some of the nodes in the working-set. One example of this would be when entering interface configuration mode for a port that exists on some members of the working-set and not on others. For example:

```

atmf1[4]# conf t

atmf1[4](config)# int port1.1.1

% Can't find interface port1.1.1

atmf1[4:2](config-if)# conf t

```

In the example above the interface **port1.1.1** exists on two of the nodes in the working-set, but doesn't exist on nodes "Master" or "x510_1". The interface configuration mode fails for these nodes, and a warning message is output to indicate this. Inside the square brackets, the first number indicates the total number of nodes in the working-set, and the second number indicates the number of nodes in the sub-configuration mode that has been entered. Any configuration commands configured in this mode will only be executed on the nodes that successfully entered the sub-configuration mode.

Entering **exit** while in this mode will return to global configuration mode for all nodes within the working-set:

```

atmf1[4:2](config-if)# exit

atmf1[4](config)# (config)#

```

Interactive Commands

It is inappropriate to execute **interactive** commands simultaneously across multiple nodes within a working-set. These commands can only be executed on the local node working-set or on a working-set with a single member.

When any interactive commands are entered from within a working-set they will give an error:

```
atmf1[4]# ping 4.2.2.1
% Working set must contain only single node for this command
```

The list of current interactive commands, including any optional parameters, are:

- ping
- mtrace/mstat
- traceroute
- boot system
- boot configuration-file
- banner login
- tcpdump
- edit
- copy
- mail
- move
- terminal monitor

AMF Backups

AMF backups are a valuable part of AMF network operation. They are the mechanism by which AMF master nodes update their records of the AMF network. By default, AMF master nodes are configured to perform automatic scheduled backups of the entire AMF network once per day at 3.00am. AMF backups can be stored on **remote file servers** or **external removable media** such as USB sticks or SD cards. These backup files can be used in the recovery of a failed node.

Note that this feature will operate only on AMF master nodes.

Using External Media Storage

If storing data on external media, it is a requirement that all AMF masters have external removable media installed with sufficient capacity to hold all of the relevant files stored in the Flash on every node in the AMF network.

Typically a 4 GB capacity external media storage would be of sufficient size to hold backups for a 40 node AMF network.

The AMF node backup system has been designed such that the external media used to store the backup data can still be used to store other data. However, care needs to be taken to ensure that enough space is reserved for future AMF backups.

- AMF requires up to 128 MB backup space for SBx8100 nodes and up to 64 MB backup space for other nodes. The output from the [show atmf backup command on page 222](#) will provide warnings if capacity on the backup media falls below a safe level.

Here is an output example from the [show atmf backup](#) command showing a backup media space warning:

Figure 10: Output showing backup media space warning

```
master1#show atmf backup

Scheduled Backup ..... Disabled
  Schedule ..... 1 per day starting at 12:45
  Next Backup Time .... 25 May 2014 12:45
Backup Media ..... SD (Total 3827.0MB, Free 7.1MB)
                        WARNING: Space on backup media is below 64MB
Current Action ..... Idle
  Started ..... -
  Current Node ..... -
```

Safe removal of external storage media

Removing external storage media, or rebooting the master node, while an AMF backup is underway could potentially cause corruption to files in the backup. Although files damaged as a result of mishandling backup media will be replaced during the next backup cycle, if the file system on the media becomes damaged, it may require reformatting before being inserted into the AMF master. To avoid any damage to the AMF backup files or file system, we recommend that the following procedure be followed before rebooting or removing any external storage media from an AMF master.

1. Disable backups to prevent a scheduled backup from occurring while the card is being removed.

2. Terminate any backup already in process.
3. Verify that it is safe to remove the media by checking that backups are disabled and that there are no backups currently in progress.

Figure 11: Example of the safe external storage media removal procedure

```

master1#conf t

master1(config)#no atmf backup enable
master1(config)#exit
master1#atmf backup stop
master1#show atmf backup

Scheduled Backup ..... Disabled
  Schedule ..... 1 per day starting at 12:45
  Next Backup Time .... 25 May 2014 12:45
  Backup Media ..... SD (Total 3827.0MB, Free 3257.1MB)
  Current Action ..... Idle
    Started ..... -
    Current Node ..... -

```

Once the media has been reinstalled, ensure that the backup scheduler is re-enabled.

Performing a Manual Backup

Whenever a new device is physically added to the AMF network as a provisioned node, we advise that you perform a manual backup from the AMF master.

To perform a manual backup of the entire AMF network, on the AMF master enter the command **atmf backup now** [command on page 168](#):

```

Master1# atmf backup now

Master1(config)# atmf backup enable

Master1(config)# exit

```

To check the status of the AMF backup use the **show atmf backup** [command on page 222](#).

Figure 12: Example output from the show atmf backup command entered during a backup

```

AMF_Master#show atmf backup
Scheduled Backup ..... Enabled
  Schedule ..... 1 per day starting at 03:00
  Next Backup Time .... 14 Dec 2013 03:00
  Backup Media ..... USB (Total 3692.6MB, Free 1782.7MB)
  Current Action ..... Doing manual backup
    Started ..... 13 Dec 2012 05:20
    Current Node ..... Member1

```

Node Name	Date	Time	In ATMF	On Media	Status
AMF_Master	13 Dec 2012	05:20:16	Yes	Yes	Good
Member1	-	-	Yes	Yes	-
Member2	-	-	Yes	No	-
Member3	-	-	Yes	No	-
Member4	-	-	Yes	No	-

Below is example output from the **show atmf backup** command entered after the backup has completed.

Figure 13: Example output from the show atmf backup command entered after backup was completed

```
AMF_Master#show atmf backup
Scheduled Backup ..... Enabled
Schedule ..... 1 per day starting at 03:00
Next Backup Time .... 13 Dec 2013 03:00
Backup Media ..... USB (Total 3692.6MB, Free 1651.1MB)
Current Action ..... Idle
Started ..... -
Current Node ..... -
```

Node Name	Date	Time	In ATMF	On Media	Status
ATMF_Master	13 Dec 2013	05:20:16	Yes	Yes	Good
Member1	13 Dec 2013	05:20:27	Yes	Yes	Good
Member2	13 Dec 2013	05:20:40	Yes	Yes	Good
Member3	13 Dec 2013	05:20:52	Yes	Yes	Good
Member4	13 Dec 2013	05:21:08	Yes	Yes	Good

Note that the file system used by the AMF backup does not support the backing up of files that have the same name but have different case (e.g. "test.txt" and "TEST.txt"), and only **one** of these files will be stored in the backup. For this reason we recommend that all files on a node be given unique file names.

Backups on a VCStack Plus running as AMF masters on an SBx8100

This section is only applicable in configurations that are NOT using remote backup servers.

When a VCStack is operating as an AMF master node, AMF backups will only occur on the external removable media of the CFC that is the stack master. Therefore, in the event of a CFC failure, the new VCS master CFC will have no access to this backup information.

To avoid this situation, you can either configure a remote backup file server or use *trigger scripts* to automatically perform a manual backup of the AMF network following a failover event. This section explains how to use trigger scripts to automatically apply a manual backup. To apply the remote file server solution see **"Backing up to Remote Servers" on page 142**.

Example 1 This example uses a manual backup activation script called **triggered-atmfbackup.scp**. When activated, this script applies the following commands to initiate a network backup:

```
enable
wait 180
atmf backup now
```

When a CFC failure event occurs, the trigger **type chassis active-CFC-fail** will activate. The following example shows how the above scripted steps can be automatically applied if this event occurs.

Example 2 This example shows a trigger script configuration for the **SBx8100**:

```
Master1# conf t
Master1(config)# trigger 1
Master1(config-trigger)# type chassis active-CFC-fail
Master1(config-trigger)# script 1 triggered-atmfbackup.scp
```

To explain the sequence; if there is a failure of a CFC that is operating as a stack master, trigger 1, which is associated with the trigger **type chassis active-CFC-fail**, will activate. This process runs the script `triggered-atmfbackup.scp`, which will then apply the preconfigured instructions shown in Example 1.

Backups on a VCStack running as AMF masters on an SBx908

In the event of a stack master failure, the trigger **type stack master-fail** will activate. The following example shows how the above scripted steps can be automatically applied if this event occurs.

Example 3 This example shows a trigger script configuration that can operate when a stack master node fails.:

```
Master1# conf t
Master1(config)# trigger 1
Master1(config-trigger)# type type stack master-fail
Master1(config-trigger)# script 1 triggered-atmfbackup.scp
```

To explain the sequence; if there is a failure of a node that is operating as a stack master, trigger 1, which is associated with the trigger **type stack master-fail**, will activate. This process runs the script `triggered-atmfbackup.scp`, which will then apply the preconfigured instructions shown in Example 1.

Backing up all master nodes

If there are multiple AMF master nodes in the network, you may also want to use a trigger script or perform a manual backup of "all" master nodes after a failover event, so that all backups are up to date.

Create an AMF working-set group that contains all master nodes, then use the **atmf working-set** command in the trigger script to execute the manual backup on all nodes within the working-set.

To create a working-set containing all AMF master nodes, first manually select all AMF masters using the **atmf working-set** command:

```
Master# atmf working-set Master1,Master2
NetworkName[2]# conf t
NetworkName[2](config)# trigger 1
```

This command displays an output screen similar to the one shown below:

```
=====
Master1, Master2
=====
Working set join
ATMF1[2]#
```

On the SBx908, enter the following configuration commands, one per line. End with CNTL/Z:

```
ATMF1{2}# conf t
ATMF1[2](config)# trigger 1
ATMF1[2](config-trigger)# type type stack master-fail
ATMF1[2](config-trigger)# script 1 triggered-atmfbackup.scp
```

On the SBx8100, enter the following configuration commands, one per line. End with CNTL/Z:

```
ATMF1{2}# conf t
ATMF1[2](config)# trigger 1
ATMF1[2](config-trigger)# type chassis active-CFC-fail
ATMF1[2](config-trigger)# script 1 triggered-atmfbackup.scp
```

Next, create a user defined working-set group containing the nodes in the current working-set using the **atmf group (membership)** command:

```
atmf1[2]# conf t
atmf1[2](config)# atmf group AMF_masters
```

Here is an example manual backup activation script called atmfbbackup_all_masters.scp:

```
enable
wait 180
atmf working-set group AMF_masters
atmf backup now
```

This script will initiate an AMF backup on all masters within the working-set.

Backing up to Remote Servers

System backup data can be held on up to two remote backup servers rather than on the master node's external media. These servers are used for both backup and recovery.

Each AMF master supports a maximum of two remote file servers. The remote backup file servers are mounted on the Master's file system using SSH and appear as folders.

Configuring a backup to a remote server

First configure the servers. After you have configured the servers you can check the backup media, location, log details and server status using the [show atmf backup](#) command. You can also manually synchronize the contents of an active server and other configured servers, if required. The following steps show how to set up two backup servers:

1. Use the command **"atmf backup server"** on page 170 for backup server 1
This command configures a remote file server(s) as the destination for AMF backups. Configuration of a remote server will switch the backup to remote server functionality and disable any further backup to external media. Use the **no** variant of this command to remove the destination servers and revert to backup from external media.
Note that if no servers are configured, the backup will go to external media. If no servers are configured and no external media exists, no backup will occur.
2. Repeat step (1) for backup server 2
You should now have two file servers configured to backup your network.
3. Use the **"atmf backup now"** on page 168 to force a manual backup of your network.

Note This step is optional. Alternatively you could wait until the next scheduled back occurs.



4. Use the command **"show atmf backup"** on page 222.
If you forced a manual backup, you will probably want to display the location and state of each configured file server. The display from this command also shows diagnostic results that test connectivity to each server by using the optional `server-status` parameter.

Below is example output from the [show atmf backup](#) command showing the configuration of two remote backup file servers.

Figure 14: Output from the show atmf backup command showing the configuration of two remote backup file servers

```
x900a#show atmf backup
Scheduled Backup ..... Enabled
Schedule ..... 24 per day starting at 14:25
Next Backup Time .... 19 May 2014 11:25
Backup Bandwidth ..... Unlimited
Backup Media ..... FILE SERVER (Total 503837.5MB, Free 186818.0MB)
Server Config .....
Synchronization ..... Synchronized
  Last Run ..... 19 May 2014 11:09:50
  1 ..... Configured (Mounted)
    Host ..... 10.36.150.54
    Username ..... user_1
    Path ..... temp/x900a_1
    Port ..... -
  * 2 ..... Configured (Mounted, Primary)
    Host ..... tb165.test.com
    Username ..... user_2
    Path ..... temp/x900a_2
    Port ..... -
Current Action ..... Idle
Started ..... -
Current Node ..... -
```

Node Name	Date	Time	In ATMF	On Media	Status
Synchronization	Date	Time	From Id	To Id	Status
-					
x210a	19 May 2014	11:09:37	Yes	Yes	Good
	19 May 2014	11:09:46	2	1	Good
x610a	19 May 2014	11:09:17	Yes	Yes	Good
	19 May 2014	11:09:19	2	1	Good
x610b	19 May 2014	11:09:49	Yes	Yes	Good
	19 May 2014	11:09:49	2	1	Good
x610c	19 May 2014	11:09:20	Yes	Yes	Good
	19 May 2014	11:09:20	2	1	Good
x610d	19 May 2014	11:09:19	Yes	Yes	Good
	19 May 2014	11:09:19	2	1	Good
x900a	19 May 2014	11:09:49	Yes	Yes	Good
	19 May 2014	11:09:50	2	1	Good
x908stk	19 May 2014	11:09:47	Yes	Yes	Good
	19 May 2014	11:09:48	Yes	Yes	Good

You can use the **show atmf backup** with the parameter **server-status** to display the results of the diagnostics that test connectivity to each server:

Figure 15: Output from the show atmf backup command showing diagnostic test results from each server

```
Master1#sh atmf backup server-status
Id Last Check State
-----
1      186 s File server ready
2         1 s SSH no route to host
```

Node Recovery

Automatic Node Recovery

With AMF, you can replace a failed node with another device and let AMF automatically load the appropriate configuration onto the replacement device.

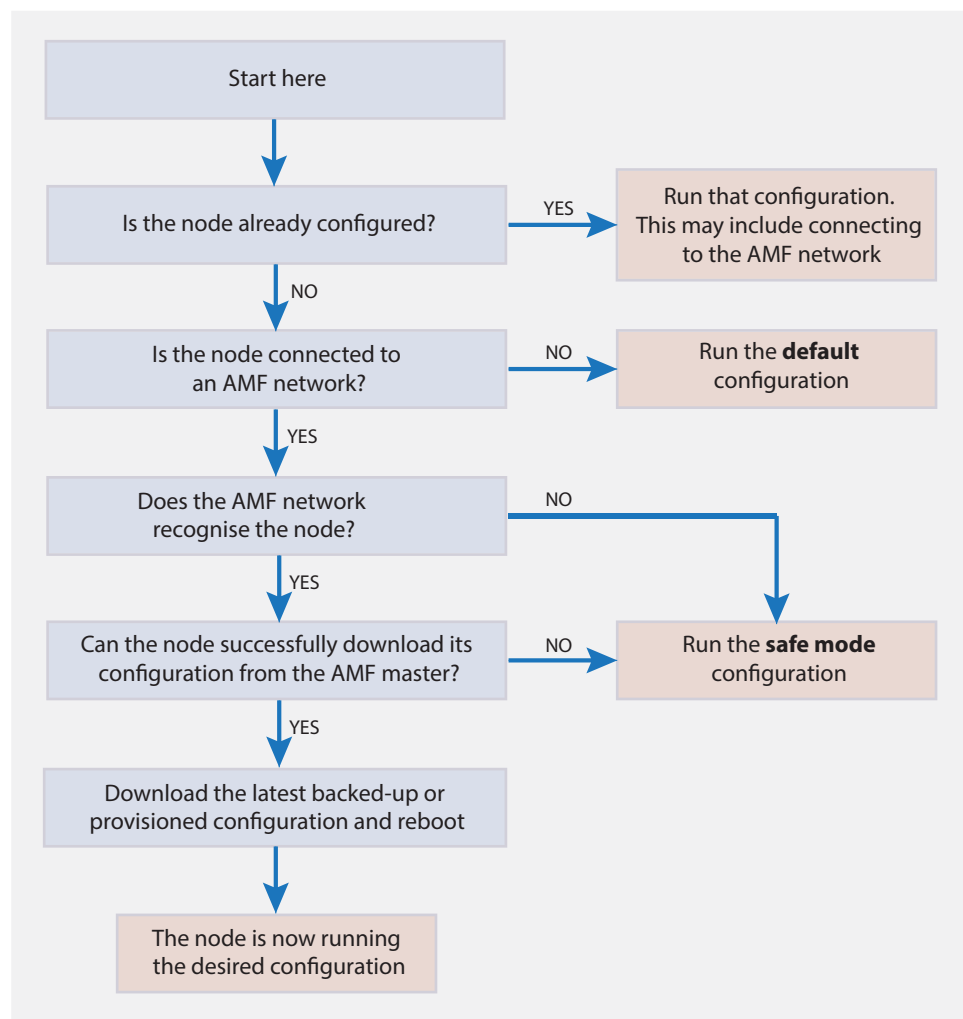
For this to work, the replacement device must have no configuration file. This means it must be either:

- a factory-new device, or
- a used device that has been returned to a “clean” state (see [“Restoring a Node to a Clean State” on page 145](#))

To replace a failed device with a new device of a different platform or with a different node name, you need to provision the network to expect the new device. See [“Node Provisioning” on page 155](#).

When a switch boots up, it goes through the process in the following flowchart to determine what configuration to use. This flowchart indicates when automatic node recovery will be successful.

Figure 16: How a switch determines which configuration to use



Automatic node recovery is not intended to recover multiple nodes simultaneously. If multiple nodes have failed, recover them one at a time.

Caution

Do not make any changes to the device's configuration while a node recovery is underway. A log message will appear on the console or other VTY session indicating when recovery has finished (whether successfully or with errors). This message can also be found by viewing the log with the **show log** command.

Figure 17: Example log output showing automatic node recovery

```
23:03:15 awplus ATMF[863]: ATMF network detected
23:03:15 awplus ATMF[863]: ATMF safe config applied (forwarding disabled)
23:03:25 awplus ATMF[863]: Shutting down all non ATMF ports
23:03:26 x510_1 ATMF[863]: Automatic node recovery started
23:03:26 x510_1 ATMF[863]: Attempting to recover as x510_1
23:03:26 x510_1 ATMF[863]: Checking master node availability
23:03:32 x510_1 ATMF[863]: Master has joined. 2 members in total.
23:03:32 x510_1 ATMF[863]: x908_VCS_2 has joined. 3 members in total.
23:03:32 x510_1 ATMF[863]: x908_VCS_1 has joined. 4 members in total.
23:03:37 x510_1 ATMFFSR[2950]: Retrieving recovery data from master node Master
23:05:18 x510_1 ATMFFSR[2950]: File recovery from master node succeeded. Node will
now reboot
Flushing file system buffers...
Unmounting any remaining filesystems...
Restarting system.
```

Recovery progress indication

This is a visual feature that displays the recovery status during automatic recovery. This feature uses two distinct flash patterns to indicate the following states:

Recovery State	LED Indication (green)
Recovery in progress	Progressive strobing of all port LEDs.
Recovery failure	All port LEDs alternating on and off, flashing at the same time.

When using this feature during a recovery failure, you can turn off the failure-alert indication and return the port LEDs to their normal running state. To do this, use the command **"atmf recover led-off"** on page 205.

You can repeat this process until the recovery failure has been fixed.

Note that the Find me and ecofriendly LED features cannot be used while AMF recovery progress indication is active.

Restoring a Node to a "Clean" State

When replacing a failed device, your replacement device should be one of the following types, in order for AMF automatic node recovery to work:

- A factory-new device
- A used device that has been returned to a "clean" state

A clean device is one that has had its previous configuration components removed. The process of cleaning is required when replacing a failed device with one that, although in working condition, has been used previously and still retains components of its previous configuration.

If you keep on-site spares, store them with clean configurations and current releases. When you upgrade your network to a new AlliedWare Plus version, we recommend you upgrade your spare devices too.

To clean up a previously used device, use the [atmf cleanup command on page 174](#). This command erases all data from NVS and Flash **apart from**:

- The boot release file (a .rel file) and its release setting file
- v1 license files /.configs/.swfeature.lic
- v2 license files /.configs/.sw_v2.lic

The device is then rebooted to put it into a clean state. The device can then be used for automatic node recovery.

Any other user files that remain in Flash will be overwritten during the automatic recovery process. If there are any files stored in the Flash of the replacement device that need to be retained, back these files up prior to installing the device into the AMF network.

Manual Node Recovery

There are certain situations where automatic recovery may fail. Automatic recovery has been designed to be cautious in its approach to recovering nodes for reasons such as:

- The backup stored on the AMF master not having a “Good” status
- The replacement device having a release of the AlliedWare Plus Operating System installed on it that is old enough to be incompatible with AW+ on the neighbor or the master.

When these situations occur, automatic node recovery will fail.

In this failed state, the replacement device will have the AMF safe configuration mode applied (see [“AMF Safe Configuration Procedures” on page 148](#)). After investigating the failure and taking remedial action, you may want to initiate manual node recovery. To do this, enter the following command:

```
amf1# atmf recover {<node_name>} {<master_node_name>}
```

where:

- **node_name** is the host name of the device you wish to recover.
- **master_node_name** is the host name of the AMF master that contains the backup you want to use for the recovery.

The manual recovery command will bypass the usual checks performed by automatic node recovery. Make sure that the backup configuration stored on the specified AMF master is correct before you execute the command.

If you attempt to manually recover a node with the backup file of a node from a **different platform**, the release file from the backup will be incompatible and won't be copied to the replacement device. Instead, the existing release on the replacement device will be used, in order to ensure the device can join the AMF network and function correctly.

Figure 18: Example output showing manual recovery

```
amf1#atmf recover x510_1 Master
This command will erase ALL flash contents. Continue node recovery? (y/n)y
Manual node recovery successfully initiated
x510_1#23:15:32 x510_1 ATMFFSR[8477]: Retrieving recovery data from master node
Master
23:17:17 x510_1 ATMFFSR[8477]: Manual node recovery completed
x510_1#
```

Node Recovery on VCStacks

Node recovery on VCStacks that are part of an AMF network is somewhat different to node recovery of standalone devices.

This is because VCStack has its own node recovery mechanism that has different requirements to AMF.

In the extremely unlikely situation of needing to replace an entire VCStack that is a member of an AMF network, you can use AMF automatic node recovery to first recover Stack ID 1, which will become the VCStack master.

The replacement device which will become the VCStack master must be a clean unit (see [“Restoring a Node to a “Clean” State” on page 145](#)).

The procedure for recovering an entire stack is as follows:

1. Connect a clean device to the AMF network, and power it on. The connections into the AMF network should be between the appropriately configured AMF links on the neighboring node, and the ports previously configured as AMF links in the backup for the failed node configuration.
2. The AMF network should detect the replacement device and begin automatic node recovery. Wait until automatic node recovery completes, then check that the replacement device has come up correctly as VCStack ID 1, and that the configuration is correct.
3. Configure the next replacement device as VCStack ID 2. Ensure it is installed with a compatible release and the same set of licenses that exist on ID 1. Connect the VCStack cables and power it on.
4. VCStack ID 1 should detect ID 2 and synchronize the configuration and firmware release. Once this has completed, check that the VCStack has formed correctly, and then connect the remaining network connections.

For any additional VCStack members, repeat the last two steps, ensuring that the VCStack ID is set to the next sequential value for each additional device that is added to the VCStack.

AMF Safe Configuration

If AMF automatic node recovery fails, AMF contains a safety net feature that puts the replacement node into a safe configuration state. This is to prevent an unconfigured device from joining the network and creating loops.

Detecting AMF Safe Configuration Operation

A log message will be generated when AMF safe configuration is applied. This message will appear in the log some time after the startup sequence.

The message will also be output to the console or any connected VTY session.

AMF Safe Configuration Procedures

The procedures for AMF safe configuration are shown below:

- A special VLAN is created in the disabled state and given the name `atmf_node_recovery_safe_vlan`. The VID of this VLAN is determined dynamically to ensure that it does not conflict with either of the AMF management VLANs, or any other VLANs that are detected on the AMF network.
- All ports are removed from their default VLAN membership (VLAN 1).
- All ports are set as tagged members of the safe VLAN.
- Additionally, all ports that are not an AMF link or cross-link are shut down. The links and crosslinks are detected by AMF and added to the dynamic configuration. This is done to ensure correct behavior of static aggregators and Layer 3 protocols configured on the neighboring devices.

Figure 19: Show vlan command output with the brief parameter set for a device in AMF safe configuration mode

```
awplus#sh vlan brief
```

VLAN ID	Name	Type	State	Member ports	(u)-Untagged, (t)-Tagged
1	default	STATIC	ACTIVE		
4090	atmf_node_recovery_safe_vlan	STATIC	SUSPEND	port1.1.1(t) port1.1.4(t) port1.1.7(t) port1.1.10(t) port1.1.12(t) port1.1.14(t) port1.1.16(t) port1.1.18(t) port1.1.20(t) port1.1.22(t) port1.1.24(t)	port1.1.2(t) port1.1.5(t) port1.1.8(t) port1.1.11(t) port1.1.13(t) port1.1.15(t) port1.1.17(t) port1.1.19(t) port1.1.21(t) port1.1.23(t)

Figure 20: Example output from the show running-config command for a device in AMF safe configuration mode

```
awplus#show running-config
...
!
vlan database
  vlan 4090 name atmf_node_recovery_safe_vlan
  vlan 4090 state disable
!
interface port1.1.1-1.1.4
  shutdown
  switchport
  switchport mode trunk
  switchport trunk allowed vlan add 4090
  switchport trunk native vlan none
!
interface port1.1.5
  switchport
  switchport atmf-link
  switchport mode trunk
  switchport trunk allowed vlan add 4090
  switchport trunk native vlan none
!
interface port1.1.6-1.1.24
  shutdown
  switchport
  switchport mode trunk
  switchport trunk allowed vlan add 4090
  switchport trunk native vlan none
!
...
```

Undoing an AMF Safe Configuration

If your node has had AMF safe configuration applied, you can use normal CLI configuration commands to modify the running-configuration to whatever configuration is required.

See below for an example of returning a device from AMF safe configuration mode to having default VLAN and port settings. Note that in this example a 24-port card has been used.

```
awplus# configure terminal
awplus(config)# interface port1.1.1-port1.1.24
awplus(config-if)# switchport trunk native vlan 1
awplus(config-if)# switchport trunk allowed vlan remove 4090
awplus(config-if)# switchport mode access

% port1.1.5 has ATMF link configured so
its mode cannot be changed
```

```
awplus(config-if)# no shutdown  
awplus(config-if)# exit  
awplus(config-if)# vlan database  
awplus(config-if)# no vlan 4090  
awplus(config-if)# end
```

In order to retain connectivity to the AMF network, AMF link and crosslink settings should not be changed. In the example above you can see that port 1.1.5 is an automatically configured AMF link. You can also see the error message indicating it was skipped by the **switchport mode access** command. This is because AMF links must be in trunk mode.

Caution

No changes should be made to the device's configuration while a node recovery is underway. A log message will appear on the console or other logged in session indicating when recovery has finished (whether successfully or with errors). This message can also be found by viewing the log with the command **show log**.

Rolling-Reboot Firmware Upgrade

The rolling-reboot firmware upgrade feature enables nodes within an AMF network to be rebooted and upgraded in a rolling sequence so that downtime and management overheads are minimized. First, specify a set of nodes within the AMF network using the **atmf working-set** command, then use the **atmf reboot-rolling** command. All nodes in the specified working-set will be rebooted and upgraded one by one, starting with the nodes furthest from the core domain, and ending with nodes closest to, or in, the core domain.

Once the rebooted node has finished running its configuration and has brought its ports up, it re-joins the AMF network and the next node in the working-set is rebooted and upgraded.

Note The **atmf rolling-reboot** command can also be used to reboot a set of nodes without upgrading the firmware.



To upgrade firmware, a download URL can be selected from any media location.

Supported media locations include:

- flash:
- card:
- usb:
- tftp:
- scp:
- http:

The latest compatible release for a node will be selected from one of these locations. Several checks need to be performed to ensure the upgrade will succeed. This includes checking that the current node release boots from Flash and that there is enough space in Flash on this node. The new release name is updated using the **boot system backup** command. The old release will become the backup release file.

Note that if the release file is to be copied from a remote location (e.g. via TFTP or HTTP), the URL should specify the exact release filename without using wild card characters.

The node is rebooted and the new software version will be used. On bootup, the software release is verified. Should an upgrade fail, the upgrading unit will fail back to its old software version. At the completion of this command, a report is run showing the release upgrade status of each node.

The **force** parameter enforces a node reboot, even though the node may not be suitable for upgrading software. This command can take a significant amount of time to complete.

Note Rolling-reboot firmware upgrades can be performed on a working-set that includes the controlling node, although in this instance the user will not be presented with a summary report upon completion.



Here is an example of a Rolling-reboot firmware upgrade summary report:

```
=====
ATMF Rolling Reboot Complete
Node Name      Reboot Status      Release Name              Release Status
-----
Node1          Rebooted           x510-main-20121018-2.rel  Upgraded
Node2          Rebooted           x900-main-20121018-2.rel  Upgraded
Node3          Rebooted           x900-main-20121018-2.rel  Upgraded
Node4          Rebooted           x510-main-20121018-2.rel  Upgraded
=====
```

Performing a Rolling-Reboot Upgrade

To perform a Rolling-reboot firmware upgrade on all nodes in the AMF network, first select all nodes using the default working-set group **all**:

```
SBSBx8100# atmf working-set group all
```

```
SBSBx8100, SBx908-VCS1, SBx908-VCS2, x510_1, x510_2:
```

```
Working set join
```

Next, using the **atmf reboot-rolling** command, specify the path to the release files to use for the upgrade. In the following example the release files are stored on the external USB storage media installed in the node controlling the Rolling-reboot firmware upgrade, in a directory called "rel". Note that because the node controlling the Rolling-reboot firmware upgrade is included in the nodes to be upgraded, a message is output indicating that no summary will be available on completion.

```
csg_vcf[5]#atmf reboot-rolling usb:/rel/*.rel
Retrieving data from SBSBx8100
Retrieving data from SBx908-VCS2
Retrieving data from x510_1
Retrieving data from x510_2
Retrieving data from SBx908-VCS1

ATMF Rolling Reboot Nodes:

Node Name                Timeout
                          (Minutes)  New Release File          Status
-----
x510_2                   9          x510-main-20121203-1.rel  Release ready
x510_1                   6          x510-main-20121203-1.rel  Release ready
SBx908-VCS1              9          x900-main-20121203-1.rel  Release ready
SBx908-VCS2              9          x900-main-20121203-1.rel  Release ready
SBSBx8100                11         SBx81CFC400-main-20121203
                          -1.rel          Release ready

% The controlling node (SBSBx8100) is included in the
rolling reboot and will be rebooted last.
No summary will be available on completion.
Continue upgrading releases ? (y/n):
=====
Copying Release      : x510-main-20121203-1.rel to x510_2
Updating Release     : x510-main-20121203-1.rel information on x510_2
=====
ATMF Rolling Reboot: Rebooting x510_2
=====
02:11:32 SBSBx8100 ATMF[1973]: x510_2 has left. 4 members in total.

% x510_2 has left the working-set
02:13:30 SBSBx8100 ATMF[1973]: x510_2 has joined. 5 members in total.
Reboot of x510_2 has completed
```

Although in this example no summary report was generated, you can refer to the progress messages output on the console to confirm that the upgrades were successful. You can also use the **atmf working-set** and the **show boot** commands to confirm the current boot image for each node in the AMF network.

```

=====
Copying Release      : x510-main-20121203-1.rel to x510_1
Updating Release     : x510-main-20121203-1.rel information on x510_1
=====
ATMF Rolling Reboot: Rebooting x510_1
=====
02:14:13 SBSBx8100 ATMF[1973]: x510_1 has left. 4 members in total.

% x510_1 has left the working-set
02:15:53 SBSBx8100 ATMF[1973]: x510_1 has joined. 5 members in total.
Reboot of x510_1 has completed

=====

Copying Release      : x900-main-20121203-1.rel to SBx908-VCS1
Updating Release     : x900-main-20121203-1.rel information on SBx908-VCS1
=====
ATMF Rolling Reboot: Rebooting SBx908-VCS1
=====
02:19:02 SBSBx8100 ATMF[1973]: x510_1 has left. 4 members in total.
02:19:02 SBSBx8100 ATMF[1973]: SBx908-VCS1 has left. 3 members in total.

% SBx908-VCS1 has left the working-set
02:20:48 SBSBx8100 ATMF[1973]: SBx908-VCS1 has joined. 4 members in total.
Reboot of SBx908-VCS1 has completed
02:20:51 SBSBx8100 ATMF[1973]: x510_1 has joined. 5 members in total.
=====
Copying Release      : x900-main-20121203-1.rel to SBx908-VCS2
Updating Release     : x900-main-20121203-1.rel information on SBx908-VCS2
=====
ATMF Rolling Reboot: Rebooting SBx908-VCS2
=====
02:21:54 SBSBx8100 ATMF[1973]: x510_2 has left. 4 members in total.
02:21:54 SBSBx8100 ATMF[1973]: SBx908-VCS2 has left. 3 members in total.

% SBx908-VCS2 has left the working-set
02:23:35 SBSBx8100 ATMF[1973]: SBx908-VCS2 has joined. 4 members in total.
Reboot of SBx908-VCS2 has completed
=====
Copying Release      : SBx81CFC400-main-20121203-1.rel to SBSBx8100
02:23:39 SBSBx8100 ATMF[1973]: x510_2 has joined. 5 members in total.
Updating Release     : SBx81CFC400-main-20121203-1.rel information on SBSBx8100
=====
ATMF Rolling Reboot: Rebooting SBSBx8100
=====
02:24:07 SBSBx8100 ATMF: reboot-rolling Rebooting SBSBx8100 at request of user
manager.

```


Node Provisioning

You can pre-configure, or provision, a port for a future node before the node is added to the network. A provisioned node can be created as a new unique entity, or can be cloned using the backup data from an existing node. When you connect the new node to the provisioned port in the AMF network, its configuration is loaded from the information stored in the backup media.

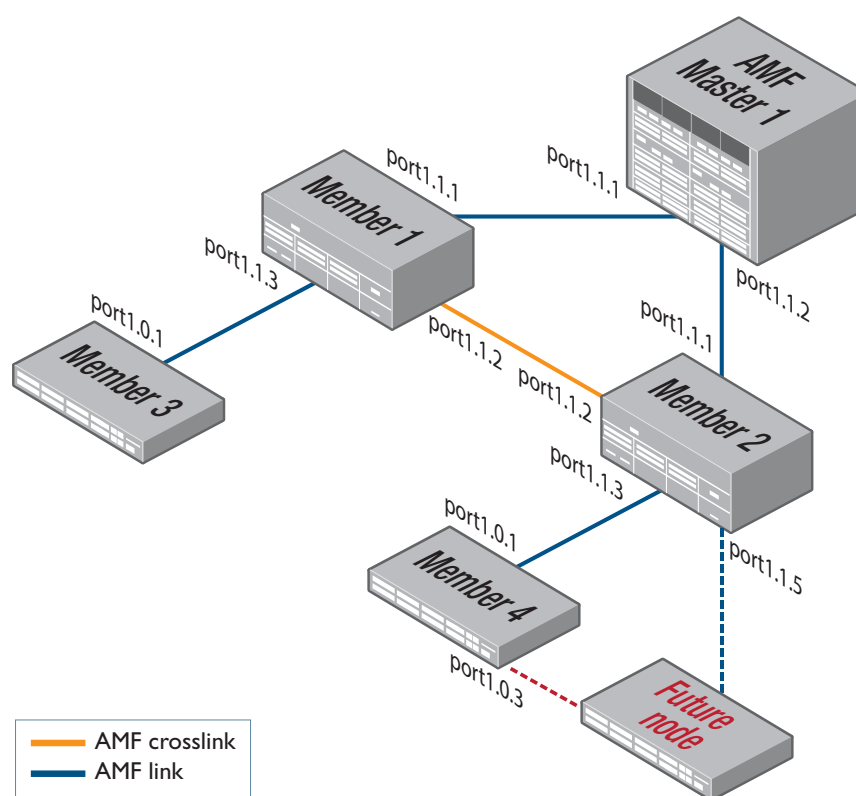
AMF commands are used to create and configure a provisioned node and to specify the port(s) that the node is expected to appear on.

When to use node provisioning

Node provisioning can be used in these instances:

- For future extension of the AMF network. You can pre-configure future AMF network nodes via the **atmf provision node** commands. The following figure illustrates the position of a future, provisioned node. Port1.1.5 on Member 2 and port1.0.3 on Member 4 would need to be configured to expect the future node

Figure 21: Provisioning for a future node



- For replacing an existing node with a new node of a **different platform** (e.g. replacing an x310 switch with an x510), and/or with a **different host name**. Using the **atmf provision node** commands you can configure the ports on adjacent nodes to accept a replacement AMF member.

Note If you are replacing an existing node with a new node of the **same platform and host name**, refer to **"Node Recovery" on page 144**. In this case, node provisioning is not necessary, and node recovery will suffice.

Creating a new provisioned node

You can pre-configure nodes by **creating** a new directory or by **cloning** an existing node (see [Table 8](#) and [Table 9](#)).

These two methods can briefly be described as:

1. Using the command “[atmf provision node create](#)” on page 193.

This command creates an “empty” directory to which release and configuration files can be added for use on a future node. You can copy configuration and release files from existing switches into the new directory. Alternatively, you can create the configuration files by following the instructions in these sections:

« **“[Creating and Using Configuration Files](#)”** in the chapter “Creating and Managing Files” in your switch’s Software Reference.

« **“[Configuring AMF](#)” on page 119.**

2. Using the command “[atmf provision node clone](#)” on page 189.

This command creates a new directory and copies most settings and files from another backup or provisioned node. You can make additional changes manually to these files, if needed.

We recommend that you select the donor node to be as close as possible to the new node, and for it to contain the same number of ports. This will limit the number of manual changes that will be required to the replicated configuration of the new node.

AMF stores the configuration files for the provisioned node on the master node’s backup media or a remote backup server. These files are automatically loaded onto the new node’s Flash when it is introduced to the network.

Configuring adjacent nodes

You need to configure the AMF links and cross-links on the adjacent node before the new node is connected. Later, when the provisioned node is introduced to the AMF network, the adjacent node(s) will recognize it and the new node will automatically join the AMF network.

If you plan to **replace** an existing AMF node with one that has a **different host name**, use the **“[atmf provision](#)” on page 188** to configure the adjacent node to expect the new node in the future. This command is used to configure all AMF links and cross-links to the new node (excluding virtual links).

If you plan to **extend** your AMF network via ports that have not been used before, you must first fully configure the ports beforehand. Such configuration includes using the command **“[atmf provision](#)” on page 188** and other commands, some of which are shown in **Table 8** and **Table 9**.

More information on configuring switches can be found in **“[Creating and Using Configuration Files](#)”** in the chapter “Creating and Managing Files” in your switch’s Software Reference.

Table 8 on page 157 outlines the procedures to follow if you want to:

- **create** a provisioned node.
- configure the existing node(s) that the provisioned node will eventually connect to.

Table 9 on page 158 outlines the procedures to follow if you want to:

- **clone** a provisioned node.
- configure the existing node(s) that the provisioned node will eventually connect to.

Table 8: Procedure for creating a provisioned node and configuring its adjacent node(s)

Step a. Enter Privileged Exec mode	<code>Member_4>enable</code>
Step b. Set the name of the provisioned node to "future_node"	<p><code>Member_4#atmf provision node future_node create</code></p> <p>This command sets up an empty directory on the backup media for use with a provisioned node.</p>
Step c. Copy and set release file	<p>To copy a release file from member4's Flash into the future_node directory, and set that release file to load onto future_node when it first boots up, enter the following commands:</p> <pre>Member_4#atmf provision node future_node locate Member_4#copy flash:member4.rel ./future_node.rel Member_4#atmf provision node future_node configure boot system future_node.rel</pre> <p>OR</p> <pre>Member_4#atmf provision node future_node locate Member_4#copy current-software member4.rel ./ future_node.rel Member_4#atmf provision node future_node configure boot system future_node.rel</pre> <p>For information on downloading AlliedWare Plus release files see the Download Centre at alliedtelesis.com/support For information on copying files see "Copying Files to and from Your Device" in the chapter "Creating and Managing Files" in your switch's Software Reference.</p>
Step d. Copy and set configuration file	<p>To copy a configuration file named current.cfg from member4's Flash into the future_node directory, and set that configuration file to load onto future_node when it first boots up, enter the following commands:</p> <pre>Member_4#atmf provision node future_node locate Member_4#copy flash:current.cfg ./future_node.cfg Member_4#atmf provision node future_node configure boot config future_node.cfg</pre> <p>For information on configuring a switch for AMF see "Configuring AMF" on page 119</p>
Step e. Edit configuration file if necessary.	<p>Note that it is important to give the provisioned node a unique hostname. To alter the config file in the AlliedWare Plus text editor, use the edit command.</p> <p>For information on configuring a switch for AMF see "Configuring AMF" on page 119</p>
Step f. Copy and set license file	<p>To copy a license certificate named member_4.txt from member4's Flash into the future_node directory, and set that license certificate to load onto future_node when it first boots up, enter the following commands:</p> <pre>Member_4#atmf provision node future_node locate Member_4#copy flash:member_4.txt ./future_node.txt Member_4#atmf provision node future_node license-cert future_node.txt</pre> <p>For information on licensing for AMF see the atmf provision node license-cert command on page 197 and the Licensing Introduction and Configuration chapter in your switch's Software Reference.</p>

Step g. Configure the port node(s) that will be connected to the provisioned node. In this example, port1.0.3 on member4 is being configured as an AMF link and to expect the provisioned node future_node	<pre>Member_4#configure terminal Member_4(config)#interface port1.0.3 Member_4(config-if)#switchport atmf-link Member_4(config-if)#switchport trunk native vlan none Member_4(config-if)#atmf provision future_node Member_4(config-if)#exit Member_4(config)#exit Member_4#atmf working-set group local</pre>
	<p>Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.</p>
	<p>Step g can be repeated to configure the ports on other adjacent nodes that will be connected to the provisioned node.</p>

Table 9: Procedure for cloning a provisioned node and configuring its adjacent nodes

Step a. Enter Privileged Exec mode	<pre>AMF_Master1>enable</pre>
Step b. Set the name of the provisioned node to "future_node". In this example, the provisioned node will be a clone of member_3	<pre>AMF_Master1#atmf provision node future_node clone member_3</pre> <p>If further changes are required, follow the commands shown in Step c in Table 8 above.</p>
Step c. Configure the port node(s) that will be connected to the provisioned node. In this example, port1.0.3 on member_4 is being configured as an AMF link and to expect the provisioned node future_node	<pre>AMF_Master1#atmf working-set member_4 member_4#configure terminal member_4(config)#interface port1.0.3 member_4(config-if)#switchport atmf-link member_4(config-if)#switchport trunk native vlan none member_4(config-if)#atmf provision future_node member_4(config-if)#exit member_4(config)#exit member_4#atmf working-set group local AMF_Master1#</pre>
	<p>Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.</p>
	<p>Step c can be repeated to configure the ports on other adjacent nodes to expect the provisioned node.</p>

Connecting a provisioned node to an AMF network

When you add the new node to the AMF network, its settings and files are automatically downloaded from the master node's backup media, or a remote backup server, to the new node's Flash. All you need to do is cable the new device into the network.

The switch's port LEDs will flash to show that its settings are being loaded. Progressive strobing of all the port LEDs indicates that a recovery is underway. For more information on the node recovery LEDs see **"Recovery progress indication" on page 145**.

The following example shows the expected output when a provisioned node named *future_node* joins the AMF network to replace a node called *member_5*.

```
21:57:35 awplus ATMF[999]: ATMF network detected
21:57:35 awplus ATMF[999]: ATMF safe config applied (forwarding disabled)
21:57:45 awplus ATMF[999]: Shutting down all non ATMF ports
21:57:45 awplus ATMF[999]: member_5 has left. 0 member in total.
21:57:45 x510-2 ATMF[999]: future_node has joined. 1 member in total.
21:57:45 x510-2 ATMF[999]: Automatic node recovery started
21:57:45 x510-2 ATMF[999]: Attempting to recover as future_node
21:57:46 x510-2 ATMF[999]: Checking master node availability
21:57:52 x510-2 ATMF[999]: AMF_Master1 has joined. 2 members in total.
21:57:54 x510-2 ATMF[999]: member_1 has joined. 3 members in total.
21:57:56 x510-2 ATMF[999]: member_2 has joined. 4 members in total.
21:58:00 x510-2 ATMF[999]: member_3 has joined. 5 members in total.
21:58:03 x510-2 ATMF[999]: member_4 has joined. 6 members in total.
21:58:04 x510-2 ATMFFSR[6779]: Retrieving recovery data from master node
AMF_Master1
21:58:34 x510-2 ATMFFSR[6779]: Licence installed from certificate.
21:58:35 x510-2 ATMFFSR[6779]: File recovery from master node succeeded. Node will
now reboot
```


AMF Commands

Contents

Introduction	163
AMF Naming Convention	163
atmf backup	164
atmf backup bandwidth	165
atmf backup delete	166
atmf backup enable	167
atmf backup now	168
atmf backup server	170
atmf backup stop	172
atmf backup synchronize	173
atmf cleanup	174
atmf distribute firmware	175
atmf domain vlan	177
atmf enable	178
atmf group (membership)	179
atmf log-verbose	181
atmf management subnet	182
atmf management vlan	184
atmf master	186
atmf network-name	187
atmf provision	188
atmf provision node clone	189
atmf provision node configure boot config	191
atmf provision node configure boot system	192
atmf provision node create	193
atmf provision node delete	195
atmf provision node license-cert	197
atmf provision node locate	199
atmf reboot-rolling	200
atmf recover	204
atmf recover led-off	205
atmf remote-login	206
atmf restricted-login	207
atmf virtual-link id ip remote-id remote-ip	208
atmf working-set	210
clear atmf links statistics	211
debug atmf	212
debug atmf packet	214
erase factory-default	217
show atmf	218
show atmf backup	222
show atmf detail	224
show atmf group	226
show atmf group members	228
show atmf links	229
show atmf links detail	231
show atmf links statistics	237
show atmf memory	240
show atmf nodes	242
show atmf provision nodes	243

show atmf tech	244
show atmf working-set	246
show debugging atmf.....	247
show debugging atmf packet	248
show running-config atmf.....	249
switchport atmf-crosslink	250
switchport atmf-link.....	252
type atmf node	253

Introduction

This chapter provides an alphabetical reference for AMF commands.

AMF Naming Convention

When AMF is enabled on a switch, it will automatically be assigned a host name. If a host name has already been assigned, by using the command **“hostname”**, this will remain. If however, no host name has been assigned, then the name applied will be the prefix, **host_** followed (without a space) by the MAC address of the device. For example, a device whose MAC address is **0016.76b1.7a5e** will have the name **host_0016_76b1_7a5e** assigned to it.

To efficiently manage your network using AMF, we strongly advise that you devise a naming convention for your network switches, and accordingly apply an appropriate hostname to each switch in your AMF network.

atmf backup

This command can only be applied to a master node. It manually schedules an AMF backup to start at a specified time and to execute a specified number of times per day.

Use the **no** variant of this command to disable the schedule.

Syntax `atmf backup {default|<hh:mm> frequency <1-24>}`
`no atmf backup enable`

Parameter	Description
<code>default</code>	Restore the default backup schedule.
<code><hh:mm></code>	Sets the time of day to apply the first backup, in hours and minutes. Note that this parameter uses the 24 hour clock.
<code>backup</code>	Enables AMF backup to external media.
<code>frequency <1-24></code>	Sets the number of times within a 24 hour period that backups will be taken.

Default Backups run daily at 03:00 AM, by default

Mode Global Configuration

Usage Running this command only configures the schedule. To enable the schedule, you should then apply the command **atmf backup enable**.

Example To schedule backup requests to begin at 11 am and execute twice per day (11 am and 11 pm), use the following command:

```
VCF_1# configure terminal
VCF_1(config)# atmf backup 11:00 frequency 2
```

Caution



File names that comprise identical text, but with differing case, such as Test.txt and test.txt, will not be recognized as being different on a FAT32 based backup media such as a USB storage device. However, these filenames will be recognized as being different on your Linux based switch. Therefore, for good practice, ensure that you apply a consistent case structure for your back-up file names.

Related Commands **atmf backup enable**
atmf backup stop
show atmf backup

atmf backup bandwidth

This command sets the maximum bandwidth in kilobytes per second (kBps) available to the AMF backup process. This command enables you to restrict the bandwidth that is utilized for downloading file contents during a backup.

Note

This command will only run on an AMF master. An error message will be generated if the command is attempted on node that is not a master.

Also note that setting the bandwidth value to zero will allow the transmission of as much bandwidth as is available, which can exceed the maximum configurable speed of 1000 kBps. In effect, zero means unlimited.

Use the **no** variant of this command to reset (to its default value of zero) the maximum bandwidth in kilobytes per second (kBps) available when initiating an AMF backup. A value of zero tells the backup process to transfer files using unlimited bandwidth.

Syntax `atmf backup bandwidth <0-1000>`

`no atmf backup bandwidth`

Parameter	Description
<code><0-1000></code>	Sets the bandwidth in kilobytes per second (kBps)

Default The default value is zero, allowing unlimited bandwidth when executing an AMF backup.

Mode Global Configuration

Examples To set an atmf backup bandwidth of 750 kBps, use the commands:

```
node2# configure terminal
node2(config)# atmf backup bandwidth 750
```

To set the atmf backup bandwidth to the default value for unlimited bandwidth, use the commands:

```
node2# configure terminal
node2(config)# no atmf backup bandwidth
```

Related Commands [show atmf backup](#)

atmf backup delete

This command removes the backup file from the external media of a specified AMF node.

Syntax `atmf backup delete <node name>`

Parameter	Description
<code><node name></code>	The AMF node name of the backup file to be deleted.

Mode Privileged Exec

Example To delete the backup file from node2, use the following command:

```
Node_1# atmf backup delete node2
```

Related Commands [show atmf backup](#)
[atmf backup now](#)
[atmf backup stop](#)

atmf backup enable

This command enables automatic AMF backups on the AMF master node that you are connected to. By default, automatic backup starts at 3:00 AM. However, this schedule can be changed by the [atmf backup command on page 164](#). Note that backups are initiated and stored only on the master nodes.

Use the **no** variant of this command to disable any AMF backups that have been scheduled and previously enabled.

Syntax `atmf backup enable`
`no atmf backup enable`

Default Automatic AMF backup functionality is enabled on the AMF master when it is configured and external media, i.e. an SD card or a USB storage device or remote server, is detected.

Mode Global Configuration

Usage A warning message will appear if you run the [atmf backup enable](#) command with either insufficient or marginal memory availability on your external storage device.

You can use the command [“show atmf backup” on page 222](#) to check the amount of space available on your external storage device.

Example To turn on automatic AMF backup, use the following command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup enable
```

Related Commands [show atmf](#)
[show atmf backup](#)
[atmf backup](#)
[atmf backup now](#)
[atmf enable](#)

atmf backup now

This command initiates an immediate AMF backup of either all AMF members, or a selected AMF member. Note that this backup information is stored in the external media on the master node of the switch on which this command is run, even though the selected AMF member may not be a master node.


Syntax `atmf backup now [<nodename>]`

Parameter	Description
<code><nodename></code> or <code><hostname></code>	The name of the AMF member to be backed up - as set by the command hostname . Where no name has been assigned to this device, then you must apply the prefix, host underscore followed (without a space) by the MAC address of the device to be backed up. For example <code>host_0016_76b1_7a5e</code> Note that the node-name appears as the command Prompt when in Privileged Exec mode.

Default A backup is initiated for all nodes on the AMF (but stored on the master nodes).


Mode Privileged Exec

Usage Although this command will select the AMF node to be backed-up; it can only be run from any AMF master node.

 **Note** The backup produced will be for the selected node but the backed-up config will reside on the external media of the AMF master node on which the command was run. However, this process will result in the information on one master being more up-to-date. To maintain concurrent backups on both masters, you can apply the backup now command to the master working-set. This is shown in **"Example 4" on page 169**.

Example 1 In this example, an AMF member has not been assigned a host name. The following command is run on the AMF_Master_2 node to immediately backup the device - identified by its MAC address of 0016.76b1.7a5e:

```
AMF_Master_2# atmf backup now host_0016_76b1_7a5e
```

 **Note** When a host name is derived from its MAC address, the syntax format entered changes from XXXX.XXXX.XXXX to XXXX_XXXX_XXXX.

Example 2 In this example, an AMF member has the host name, **office_annex**. The following command will immediately backup this device:

```
AMF_Master_2# atmf backup now office_annex
```

This command is initiated on the switch's master node named **AMF_Master_2** and initiates an immediate backup on the switch named **office_annex**.

Example 3 To initiate from AMF_master_1 an immediate backup of all AMF member nodes, use the following command:

```
AMF_Master_1# amf backup now
```

Example 4 To initiate an immediate backup of the node with the host-name "office_annex" and store the configuration on both masters, use the following process:

From the AMF_master_1, set the working-set to comprise only of the automatic group, master nodes.

```
AMF_Master_1# atmf working-set group master
```

This command returns the following display:

```
=====
AMF_Master_1, AMF_Master_2
=====

Working set join
```

Backup the AMF member with the host name, **office_annex** on both the master nodes as defined by the working set.

```
AMF_Master[2]# atmf backup now office_annex
```

Note that the [2] shown in the command prompt indicates a 2 node working-set.

Related Commands [atmf backup](#)
[atmf backup stop](#)
[hostname](#)
[show atmf backup](#)

atmf backup server

This command configures remote file servers as the destination for AMF backups.

Use the **no** variant of this command to remove the destination server(s). When all servers are removed the system will revert to backup from external media.

Syntax `atmf backup server id {1/2} <hostlocation> username <username> [path <path> | port <1-65535>]`

`no atmf backup server id {1/2}`

Parameter	Description
id	Remote server backup server identifier.
{1/2}	The backup server identifier number (1 or 2). Note that there can be up to two backup servers, numbered 1 and 2 respectively, and you would need to run this command separately for each server.
<hostlocation>	Either the name or the IP address (IPv4 or IPv6) of the selected backup server (1 or 2).
username	Configure the username to log in with on the selected remote file server.
<username>	The selected remote file server's username.
path	The location of the backup files on the selected remote file server. By default this will be the home directory of the username used to log in with.
<path>	The directory path utilized to store the backup files on the selected remote file server. No spaces are allowed in the path.
port	The connection to the selected remote backup file server using SSH. By default SSH connects to a device on TCP port 22 but this can be changed with this command.
<1-65535>	A TCP port within the specified range.

Defaults Remote backup servers are not configured. The default SSH TCP port is 22. The path utilized on the remote file server is the home directory of the username.

Mode Global Exec

Usage The hostname and username parameters must both be configured.

Examples To configure a remote backup server at 192.168.1.1 with the login username of backup1, the backup repository on atmf/network/location/ port 1024, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 1 192.168.1.1
                        username backup1 path atmf/network/
                        location/port 1024
```


To configure server 1 with an ipv4 address and a username of backup1, use the commands:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 1 192.168.1.1
                        username backup1
```

To configure server 1 with an ipv6 address and a username of backup1, use the command:

```
AMF_backup1_1# configure terminal
AMF_Master_1(config)# atmf backup server id 1 FFEE::01 username
                        backup1
```

To configure server 2 with a hostname and username, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 2 www.example.com
                        username backup2
```

To configure server 2 with a hostname and username in addition, the optional path and port parameters, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 2 www.example.com
                        username backup2 path tokyo port 1024
```

To unconfigure the AMF remote backup file server 1, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# no atmf backup server id 1
```

Related Commands [show atmf backup](#)

atmf backup stop

Running this command stops a backup that is currently running on the master node you are logged onto. Note that if you have two masters and want to stop both, then you can either run this command separately on each master node, or add both masters to a working set, and issue this command to the working set.

Syntax `atmf backup stop`

Mode Privileged Exec

Usage This command is used to halt an AMF backup that is in progress. In this situation the backup process will finish on its current node and then stop.

Example To stop a backup that is currently executing on master node VCF-1, use the following command:

```
AMF_Master_1# amf backup stop
```

Related Commands [atmf backup](#)
[atmf backup enable](#)
[atmf backup now](#)
[show atmf backup](#)

atmf backup synchronize

For the master node you are connected to, this command initiates a system backup of files from the node's active remote file server to its backup remote file server. Note that this process happens automatically each time the network is backed up.

Syntax `atmf backup synchronize`

Mode Privileged Exec

Example When connected to the master node AMF_Master_1, the following command will initiate a backup of all system related files from its active remote file server to its backup remote file server.

```
AMF_Master_1# atmf backup synchronize
```

Related Commands `show atmf backup`
 `atmf backup enable`
 `show atmf`

atmf cleanup

This command erases all data from NVS and all data from Flash **excluding** the following:

- The current release file and its /flash/.release file
- The backup release file and /flash/.backup file
- v1 license files /flash/.configs/.swfeature.lic
- v2 license files /flash/.configs/.sw_v2.lic

It then reboots to put the device in a clean state ready to be used as a replacement node on a provisioned port.

Syntax atmf cleanup

Mode Privileged Exec

Usage This command is an alias to the [erase factory-default command on page 217](#).

Example To erase data, use the command:

```
Node_1(config)# atmf cleanup
```

```
This command will erase all NVS, all flash contents except  
for the boot release, and any license files, and then  
reboot the switch. Continue? (y/n):y
```

Related Commands [erase factory-default](#)

atmf distribute firmware

This command can be used to upgrade software one AMF node at a time. A URL can be selected from any media location. The latest compatible release for a node will be selected from this location.

Several procedures are performed to ensure the upgrade will succeed. This includes checking the current node release boots from flash. If there is enough space on flash the software release is copied to flash on the new location.

The new release name is updated using the **boot system** command. The old release will become the backup release file. If a release file exists in a remote device (such as TFTP or HTTP, for example) then the URL should specify the exact release filename without using a wild card character.

Supported units include x908, x8100, x610, x210 and all stack configurations.

The command will continue to upgrade software until all nodes are upgraded. At the end of the upgrade cycle the **reboot** command should be used on the working-set.

Syntax `atmf distribute firmware <url>`

Parameter	Description
<code><url></code>	The URL of the file. See "URL Syntax" in the "Creating and Managing Files" chapter of your switch's Software Reference for valid URL syntax.

Mode Privileged Exec

Examples To upgrade nodes in a atmf network with a predefined AMF group called `sw_team`, use the following commands:

```
SW_Team1# atmf working-set group sw_team
```

Output

```
=====
SW_Team1, SW_Team2, SW_Team3:
=====

Working set join
```

```
ATMF_NETWORK[3]# atmf distribute firmware card:*.rel
```

Output

```
Retrieving data from SW_Team1
Retrieving data from SW_Team2
Retrieving data from SW_Team3

ATMF Firmware Upgrade:

Node Name           New Release File           Status
-----
SW_Team1            x510-main-20140204-2.rel   Release ready
SW_Team2            x610-main-20140204-2.rel   Release ready
SW_Team3            x610-main-20140204-2.rel   Release ready
Continue the rolling reboot ? (y/n):y
=====
Copying Release      : x510-main-20140204-2.rel to SW_Team1
Updating Release     : x510-main-20140204-2.rel information on SW_Team1
=====
Copying Release      : x610-main-20140204-2.rel to SW_Team2
Updating Release     : x610-main-20140204-2.rel information on SW_Team2
=====
Copying Release      : x610-main-20140204-2.rel to SW_Team3
Updating Release     : x610-main-20140204-2.rel information on SW_Team3
=====
New firmware will not take effect until nodes are rebooted.
=====

ATMF_NETWORK[3]#
```

Related Commands [atmf working-set](#)

atmf domain vlan

The AMF domain vlan is one of the internal VLANs that are used to communicate information about the state of the AMF network between nodes. AMF uses its internal VLANs (the management VLAN and the domain VLAN) to communicate its inter nodal network status information. These VLANs must be reserved for AMF and not used for other purposes.

When an AMF network is first created all its nodes are assigned a domain VLAN with a default (domain) VID of 4091. An important point conceptually is that although this VLAN then exists globally across the AMF network, it is assigned separately to each domain. The AMF network therefore can be thought of as comprising a series of domain VLANs each having the same VID and each being applied to a horizontal slice (domain) of the AMF. It follows therefore that the domain VLANs are only applied to ports that form cross-links and not to ports that form uplinks/downlinks.

If you assign a VLAN ID to this VLAN (i.e. changing its value from the default of 4091) then you will need to do this separately on every device within the AMF network. The AMF domain subnet will then be applied to this new VID when all devices within the AMF network are next rebooted.

Use the **no** variant of this command to reset the VLAN ID to its default value of 4091.


Syntax `atmf domain vlan <2-4090>`
`no atmf domain vlan .`

Parameter	Description
<code><2-4090></code>	The VLAN number in the range 2 to 4090.

Default The default domain VLAN ID for the AMF is 4091.

Mode Global Configuration

Usage The VLANs involved in this process, must be reserved for AMF and cannot be used for other purposes. This command enables you to change the domain VLAN to match your network's specific configuration.

Caution  Setting this command, then rebooting the switch will only apply the AMF VLAN for the switch being configured. The new domain vlan will not become effective for the AMF network until all its member nodes have been updated, and all its member switches rebooted.

As part of its automatic creation process, this VLAN will also be assigned an IP subnet address based on the value configured by the command **"atmf management subnet"** on [page 182](#). Refer to this command for more information.

Examples To change the AMF domain VLAN to 4000 use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# atmf domain vlan 4000
```

To reset the AMF domain VLAN to its default of 4091, use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# no atmf domain vlan
```

atmf enable

This command manually enables (turns on) the AMF feature for the switch being configured.

Use the **no** variant of this command to disable (turn off) the AMF feature on the member node.

Syntax atmf enable
 no atmf enable

Default Once AMF is configured, the AMF feature starts automatically when the switch starts up.

Mode Global Configuration

Usage The switch does not auto negotiate AMF domain specific settings such as the Network Name. You should therefore, configure your switch with any domain specific (non default) settings before enabling AMF.

Examples To turn on the AMF the feature:

```
MyNode# config terminal
MyNode(config)# atmf enable
```

To turn off the AMF feature:

```
MyNode(config)# no atmf enable
```

This command returns the following display:

```
% Warning: The ATMF network config has been set to enable
% Save the config and restart the system for this change to take
effect.
```


atmf group (membership)

This command configures a switch to be a member of one or more AMF groups. Groups exist in three forms: Implicit Groups, Automatic Groups, and User-defined Groups.

- Implicit Groups
 - « all - All nodes in the AMF
 - « current - The current working-set
 - « local - The originating node.

Note that the Implicit Groups do not appear in show group output.
- Automatic Groups - These are defined by hardware architecture, e.g. x510, x610, x900, x8100.
- User-defined Groups - These enable you to define arbitrary groups of AMF members based on your own criteria.

Each node in the AMF is automatically assigned membership to the implicit groups, and the automatic groups that are appropriate to its node type, e.g. x610, PoE. Similarly, nodes that are configured as masters are automatically assigned to the master group.

Use the **no** variant of this command to remove the membership.

Syntax `atmf group <group-list>`
`no atmf group <group-list>`

Parameter	Description
<code><group-list></code>	A list of group names. These should be entered as a comma delimited list without spaces.

Mode Global Configuration

Usage You can use this command to define your own arbitrary groups of AMF members based on your own network's configuration requirements. Applying a node to a non existing group will result in the group automatically being created.

Note that the master nodes are automatically assigned to be members of the pre-existing master group.

The following example configures the switch to be members of three groups; two are company departments, and one comprises all devices located in building_2. To avoid having to run this command separately on each device that is to be added to these groups, you can remotely assign all of these devices to a working-set, then use the capabilities of the working-set to apply the **atmf group (membership)** command to all members of the working set.

Example To specify the switch to become a member of AMF groups named, Marketing, Sales, and Building_2, use the following command:

```
VCF-1# configure terminal
VCF-1(config)# atmf group marketing,sales,building_2
```

First add the nodes "master_node1" and "member_node_1" to the working-set:

```
master_node# atmf working-set master_node1,member_node_1
```

This command returns the following output confirming that the nodes "master_node" and "node_2" are now part of the working-set:

```
=====
master_node1, member_node_1
=====

Working set join
```

```
atmf-net[2]# configure terminal
```

Add the groups building1 and sales to the working-set

```
atmf-net[2](config)# atmf group building1,sales
atmf-net[2](config)# exit
```

Show the groups that are members of the working-set

```
atmf-net[2]# show atmf group
```

This command returns the following output displaying the groups that are members of the working-set.

```
=====
master_node1
=====

AMF group information

building1, sales, master, poe, x8100
```

Related Commands [show atmf group](#)
[show atmf group members](#)

atmf log-verbose

This command limits the number of log messages displayed on the console or permanently logged.

Syntax atmf log-verbose <1-3>
no atmf log-verbose

Parameter	Description
<1-3>	The verbose limitation (3 = noisiest, 1 = quietest)

Default The default log display is 3.

Usage This command is intended for use in large networks where verbose output can make the console unusable for periods of time while nodes are joining and leaving.

Mode Global Configuration

Example To set the log-verbose to noise level 2, use the command:

```
VCF-1# configure terminal
VCF-1(config)# atmf log-verbose 2
```

Validation Command show atmf

atmf management subnet

This command is used to assign a subnet that will be allocated to the AMF management and domain management VLANs. From the address space defined by this command, two subnets are created, a management subnet component and a domain component, as explained in the Usage section of this command description.

AMF uses these internal IPv4 subnets when exchanging its inter nodal status packets. These subnet addresses must be reserved for AMF and should be used for no other purpose.

The new management subnet will not become effective until all members of the AMF network have been updated and all its units rebooted.

Use the **no** variant of this command to remove the assigned subnet VLANs.

Syntax `atmf management subnet <a.b.0.0>`
`no atmf management subnet`

Parameter	Description
<code><a.b.0.0></code>	<p>The IP address selected for the management subnet. Because a mask of 255.255.0.0 (i.e. /16) will be applied automatically, an IP address in the format a.b.0.0 must be selected.</p> <p>Usually this subnet address is selected from an appropriate range from within the private address space of 172.16.0 to 172.31.255.255, or 192.168.0.0 as defined in RFC1918.</p>

Default 172.31.0.0 (Note that a subnet mask of 255.255.0.0 will automatically be applied).

Mode Global Configuration

Usage Typically a network administrator would use this command to change the default subnet address to match local network requirements.

As previously mentioned, running this command will result in the creation of a further two subnets (within the class B address space assigned) and the mask will extend from /16 to /17.

For example, if the management subnet is assigned the address 172.31.0.0/16, this will result in the automatic creation of the following two subnets:

- 172.31.0.0/17 assigned to the **atmf management vlan**
- 172.31.128.0/17 assigned to the **atmf domain vlan**.

Examples To change the AMF management subnet address on node VCF-1 to 172.25.0.0:

```
VCf-1# configure terminal
VCf-1(config)# atmf management subnet 172.25.0.0
```

To change the AMF management subnet address on node VCF-1 back to its default of 172.31.0.0:

```
VCf-1# configure terminal
VCf-1(config)# no atmf management subnet
```

atmf management vlan

The AMF management VLAN is created when the AMF network is first initiated and is assigned its default VID of 4092. This command enables you to change the VID from this default value.

The AMF management vlan is one of the internal VLANs that are used to communicate information about the state of the AMF network between nodes. AMF uses its internal VLANs (such as the management VLAN and the domain VLAN) to communicate its inter nodal network status information. These VLANs must be reserved for AMF and not used for other purposes.

If you assign a VLAN ID to this VLAN (i.e. change its value from the default of 4092) then you will need to do this separately on every device within the AMF. The AMF management subnet will then be applied to this new VID when all devices within the AMF network are next rebooted.

Use the **no** variant of this command to restore the VID to the default of 4092.

Syntax `atmf management vlan <2-4090>`

`no atmf management vlan`

Parameter	Description
<code><2-4090></code>	The VID assigned to the AMF management VLAN.

Default The default VLAN ID for the AMF is 4092.

Note Although the value applied by default lies outside the user configurable range. You can use the "no" form of this command to reset the VLAN to its default value.



Mode Global Configuration

Usage You can use this command to change the management VLAN to meet your network's requirements and standards, particularly in situations where the default address value is unacceptable.

Note This VLAN will automatically be assigned an IP subnet address based on the value configured by the command "**atmf management subnet**" on page 182. Refer to this command description for further details.



Examples To change the AMF management VLAN to 4090 use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# atmf management vlan 4090
```

To reset the AMF domain VLAN to its default of 4092, use the following commands:

```
VCF-1# configure terminal
```

```
VCF-1(config)# no atmf management vlan
```

Related Commands [atmf domain vlan](#)
[show atmf](#)

atmf master

This command configures the switch to be an AMF master node and automatically creates an AMF master group. The master node is considered to be the core of the AMF network, and must be present for the AMF to form. The AMF master has its node depth set to 0. Note that the node depth vertical distance is determined by the number of uplinks/downlinks that exist between the node and its master.

An AMF master node must be present for an AMF network to form. Up to two AMF master nodes may exist in a network, and they **must** be connected by an AMF crosslink.

Note Master nodes are an essential component of an AMF network. In order to run AMF, an AMF License is required for each master node.



If the crosslink between two AMF masters fails, then one of the masters will become isolated from the rest of the AMF network.

Use the **no** variant of this command to remove the switch as an AMF master node. The node will retain its node depth of 0 until the network is rebooted.

Note Node depth is the vertical distance (or level) from the master node (whose depth value is 0).



Syntax `atmf master`
`no atmf master`

Default The switch is not configured to be an AMF master node.

Mode Global Configuration

Example To specify that this node is an AMF master, use the following command:

```
VCF-1# configure terminal
VCF-1(config)# atmf master
```

Related Commands [show atmf](#)
[show atmf group](#)

atmf network-name

This command applies an AMF network name to a (prospective) AMF node. In order for an AMF network to be valid, its network-name must be configured on at least two nodes, one of which must be configured as a master and have an AMF License applied. These nodes may be connected using either AMF downlinks or crosslinks.

For more information on configuring an AMF master node, see [“atmf master” on page 186](#).

Use the **no** variant of this command to remove the AMF network name.

Syntax `atmf network-name <name>`


`no atmf network-name`

Parameter	Description
<code><name></code>	The AMF network name. Up to 15 printable characters can be entered for the network-name.

Mode Global Configuration

Usage This is one of the essential commands when configuring AMF and must be entered on each node that is to be part of the AMF. This command will not take effect until the particular node is rebooted.

A switching node (master or member) may be a member of only one AMF network.

Caution  Ensure that you enter the correct network name. Entering an incorrect name will cause the AMF network to fragment (at the next reboot).

Example To set the AMF network name to amf_net use the command:

```
Node_1(config)# atmf network-name amf_net
```

atmf provision

This command configures a specified port on an AMF node to accept a provisioned node, via an AMF link, some time in the future.

Use the **no** variant of this command to remove the provisioning on the node.

Syntax `atmf provision [<nodename>]`
`no atmf provision`

Parameter	Description
<code><nodename></code>	The name of the provisioned node that will appear on the AMF network in the future.

Default No provision.

Mode Interface Configuration

Usage The port should be configured as an AMF link or cross link and should be “down” to add or remove a provisioned node.

Example To provision an AMF node named node1 for port1.0.1, use the command:

```
host1(config)# interface port1.0.1
host1(config-if)# atmf provision node1
```

Related Commands `switchport atmf-link`
 `switchport atmf-crosslink`
 `show atmf links`

atmf provision node clone

This command sets up a space on the backup media for use with a provisioned node and copies into it almost all files and directories from a chosen backup or provisioned node.

Alternatively, you can set up a new, unique provisioned node by using the command **atmf provision node create**.

Syntax `atmf provision node <nodename> clone <source nodename>`

Parameter	Description
<code><nodename></code>	The name that will be assigned to the clone when connected.
<code><source nodename></code>	The name of the node whose configuration is to be copied for loading to the clone.

Mode Privileged Exec

Usage This command is only available on master nodes in the AMF network.

You must run either this command or **atmf provision node create** command, before you can use other “atmf provision node” commands using the specified node name. If a backup or provisioned node already exists for the specified node then you must delete it before using the **atmf provision node clone** command.

When using this command it is important to be aware of the following:

- A copy of `<media>:atmf/<atmf_name>/nodes/<source_node>/flash` will be made for the provisioned node and stored in the backup media.
- The directory `<node_backup_dir>/flash/.config/ssh` is excluded from the copy.
- All contents of `<root_backup_dir>/nodes/<nodename>` will be deleted or overwritten.
- Settings for the expected location of other provisioned nodes are excluded from the copy.

The active and backup configuration files are automatically modified in the following ways:

- The “hostname” command is modified to match the name of the provisioned node.
- The “stack virtual-chassis-id” command is removed, if present.

Example To copy from the backup of Switch2 to create backup files for the new provisioned node Switch3 use the following command:

```
switch1# atmf provision node switch3 clone switch2
```

Figure 1: Sample output from the atmf provision node clone command

```
switch1#atmf provision node switch3 clone switch2
Copying...
Successful operation
```

To confirm that a new provisioned node has been cloned, use the command:

```
switch1# show atmf backup
```

The output from this command is shown in [Figure 2](#), below, and shows the details of the new provisioned node switch3.

Figure 2: Sample output from the show atmf backup command

```
switch1#show atmf backup
Scheduled Backup ..... Enabled
  Schedule ..... 1 per day starting at 03:00
  Next Backup Time .... 01 Jan 2014 03:00
Backup Bandwidth ..... Unlimited
Backup Media ..... USB (Total 7446.0MB, Free 7297.0MB)
Server Config .....
  Synchronization ..... Unsynchronized
  Last Run ..... -
  1 ..... Unconfigured
  2 ..... Unconfigured
Current Action ..... Idle
Started ..... -
Current Node ..... -
```

Node Name	Date	Time	In ATMF	On Media	Status
switch3	-	-	No	Yes	Prov
switch1	01 Jan 2014	00:05:49	No	Yes	Good
switch2	01 Jan 2014	00:05:44	Yes	Yes	Good

atmf provision node configure boot config

This command sets the configuration file to use during the next boot cycle. This command can also set a backup configuration file to use if the main configuration file cannot be accessed for an AMF provisioned node. To unset the boot configuration or the backup boot configuration use the no boot command.

Use the **no** variant of this command to set back to the default.

Syntax `atmf provision node <nodename> configure boot config [backup]
[<file-path|URL>]`
`atmf provision node [<nodename>] configure no boot config [backup]`

Parameter	Description
<nodename>	The name of the provisioned node.
<file-path URL>	The path or URL and name of the configuration file.

Default No boot configuration files or backup configuration files are specified for the provisioned node.

Mode Privileged Exec

Usage When using this command to set a backup configuration file, the specified AMF provisioned node must exist. The specified file must exist in the flash directory created for the provisioned node in the AMF remote backup media.

Examples To set the configuration file `branch.cfg` on the AMF provisioned node `node1`, use the command:

```
MasterNodeName# atmf provision node node1 configure boot  
config branch.cfg
```

To set the configuration file `backup.cfg` as the backup to the main configuration file on the AMF provisioned node `node1`, use the command:

```
MasterNodeName# atmf provision node node1 configure boot  
config backup usb:/atmf/amf_net/nodes/node1/  
config/backup.cfg
```

To unset the boot configuration, use the command:

```
MasterNodeName# atmf provision node node1 configure no boot  
config
```

To unset the backup boot configuration, use the command:

```
MasterNodeName# atmf provision node node1 configure no boot  
config backup
```

Related Commands [atmf provision node configure boot system](#)
[show atmf provision nodes](#)

atmf provision node configure boot system

This command sets the release file that will load onto a specified provisioned node during the next boot cycle. This command can also set the backup release file to be loaded for an AMF provisioned node. To unset the boot system release file or the backup boot release file use the no boot command.

Use the **no** variant of this command to set back to the default.

This command can only be run on amf master nodes.

Syntax

```
atmf provision node <nodename> configure boot system [backup]
[<file-path|URL>]

atmf provision node <nodename> configure no boot system [backup]
```

Parameter	Description
<nodename>	The name of the provisioned node.
<file-path URL>	The path or URL and name of the release file.

Default No boot release file or backup release files are specified for the provisioned node.

Mode Privileged Exec

Usage When using this command to set a backup release file, the specified AMF provisioned node must exist. The specified file must exist in the flash directory created for the provisioned node in the AMF remote backup media.

Examples To set the release file x900-5.4.4-1.rel on the AMF provisioned node node1, use the command:

```
MasterNodeName# atmf provision node node1 configure boot
system x900-5.4.4-1.rel
```

To set the backup release file 900-5.4.4-1.rel as the backup to the main release file on the AMF provisioned node node1, use the command:

```
MasterNodeName# atmf provision node node1 configure boot
system backup card:/atmf/amf_net/nodes/
node1/flash/x900-5.4.4-1.rel
```

To unset the boot release, use the command:

```
MasterNodeName# atmf provision node node1 configure no boot
system
```

To unset the backup boot release, use the command:

```
MasterNodeName# atmf provision node node1 configure no boot
system backup
```

Related Commands [atmf provision node configure boot config](#)
[show atmf provision nodes](#)

atmf provision node create

This command sets up an empty directory on the backup media for use with a provisioned node. This directory can have configuration and release files copied to it from existing switches. Alternatively, the configuration files can be created by the user.

An alternative way to create a new provisioned node is with the command **atmf provision node clone**.

This command can only run on amf master nodes.

Syntax `atmf provision node <nodename> create`

Parameter	Description
<nodename>	The name of the node that is being provisioned.

Mode Privileged Exec

Usage This command is only available on master nodes in the AMF network.

The **atmf provision node create** **atmf** command (or **atmf provision node clone**) must be executed before you can use other "atmf provision node" commands with the specified node name. If a backup or provisioned node already exists for the specified node name then you must delete it before using this command.

A date and time is assigned to the new provisioning directory reflecting when this command was executed. If there is a backup or provisioned node with the same name on another AMF master then the most recent one will be used.

Example To create a new provisioned node named switch2 use the command:

```
switch1# atmf provision node switch2 create
```

Running this command will create the following directories:

- <media>:atmf/<atmf_name>/nodes/<node>
- <media>:atmf/<atmf_name>/nodes/<node>/flash

To confirm the new node's settings, use the command:

```
switch1# show atmf backup
```

The output for the show atmf backup command is shown in **Figure 3**, and shows details for the new provisioned node switch2.

Figure 3: Sample output from the show atmf backup command

```
switch1#show atmf backup
```

Scheduled Backup	Enabled
Schedule	1 per day starting at 03:00
Next Backup Time	02 Jan 2014 03:00
Backup Bandwidth	Unlimited
Backup Media	USB (Total 7446.0MB, Free 7315.2MB)
Server Config	
Synchronization	Unsynchronized
Last Run	-
1	Unconfigured
2	Unconfigured
Current Action	Idle
Started	-
Current Node	-

Node Name	Date	Time	In ATMF	On Media	Status
switch2	-	-	No	Yes	Prov
switch1	01 Jan 2014	00:05:49	No	Yes	Good

For instructions on how to configure on a provisioned node refer to **“Configuring AMF” on page 119** and **“Creating and Using Configuration Files”** in the “Creating and Managing Files” chapter of your switch’s Software Reference.

Related commands **atmf provision node clone**

atmf provision node delete

This command deletes files that have been created for loading onto a provisioned node. It can only be run on master nodes.

Syntax `atmf provision node <nodename> delete`

Parameter	Description
<nodename>	The name of the provisioned node to be deleted.

Mode Privileged Exec

Usage This command is only available on master nodes in the AMF network. The command will only work if the provisioned node specified in the command has already been set up (although the device itself is still yet to be installed). Otherwise, an error message is shown when the command is run.

You may want to use the **atmf provision node delete** command to delete a provisioned node that was created in error or that is no longer needed.

This command cannot be used to delete backups created by the AMF backup procedure. In this case, use the command **atmf backup delete** to delete the files.

 **Note** This command allows provisioned entries to be deleted even if they have been referenced by the **atmf provision** command, so take care to only delete unwanted entries.

Example To delete backup files for a provisioned node named switch3 use the command:

```
switch1# atmf provision node switch3 delete
```

To confirm that the backup files for provisioned node switch3 have been deleted use the command:

```
switch1# show atmf backup
```

The output should show that the provisioned node switch3 no longer exists in the backup file, as shown in **Figure 4**:

Figure 4: Sample output showing the show atmf backup command

```

switch1#show atmf backup

Scheduled Backup ..... Enabled
Schedule ..... 1 per day starting at 03:00
Next Backup Time .... 01 Jan 2014 03:00
Backup Bandwidth ..... Unlimited
Backup Media ..... USB (Total 7446.0MB, Free 7297.0MB)
Server Config .....
Synchronization ..... Unsynchronized
Last Run ..... -
1 ..... Unconfigured
2 ..... Unconfigured
Current Action ..... Idle
Started ..... -
Current Node ..... -

```

Node Name	Date	Time	In ATMF	On Media	Status
switch1	01 Jan 2014	00:05:49	No	Yes	Good
switch2	01 Jan 2014	00:05:44	Yes	Yes	Good

Related commands **atmf provision node create**

atmf provision node license-cert

This command is used to set up the license certificate for a provisioned node.

The certificate file usually has all the license details for the network, and can be stored anywhere in the network. This command makes a hidden copy of the certificate file and stores it in the space set up for the provisioned node on AMF backup media.

For node provisioning, the new device has not yet been part of the AMF network, so the user is unlikely to know its product ID or its MAC address. When such a device joins the network, assuming that this command has been applied successfully, the copy of the certificate file will be applied automatically to the provisioned node.

Once the new device has been resurrected on the network and the certificate file has been downloaded to the provisioned node, the hidden copy of the certificate file is deleted from AMF backup media.

Use the **no** variant of this command to set it back to the default.

This command can only be run on amf master nodes.

Syntax `atmf provision node {<nodename>} license-cert <file-path/URL>`
`no atmf provision node {<nodename>} license-cert`

Parameter	Description
<nodename>	The name of the provisioned node.
<file-path/URL>	The name of the certificate file. This can include the file-path of the file.

Default No license certificate file is specified for the provisioned node.

Mode Privileged Exec

Usage This command is only available on master nodes in the AMF network. It will only operate if the provisioned node specified in the command has already been set up, and if the license certification is present in the backup file. Otherwise, an error message is shown when the command is run.

Example 1 To apply the license certificate cert1.txt stored on a TFTP server for AMF provisioned node "Switch2", use the command:

```
switch1# atmf provision node switch2 license-cert  
tftp://192.168.1.1/cert1.txt
```

Example 2 To apply the license certificate cert2.txt stored on AMF master's flash directory for AMF provisioned node "host2", use the command:

```
switch1# atmf provision node switch2 license-cert/  
cert2.txt
```

To confirm that the license certificate has been applied to the provisioned node, use the command **show atmf provision nodes**. The output from this command is shown **Figure 5** below, and displays license certification details in the last line.

Figure 5: Sample output from the show atmf provision nodes command

```
switch1#show atmf provision nodes

ATMF Provisioned Node Information:

Backup Media .....: SD (Total 3827.0MB, Free 3481.1MB)

Node Name           : switch2
Date & Time         : 06-May-2014 & 23:25:44
Provision Path      : card:/atmf/nodes

Boot configuration :
Current boot image  : x510-1766_atmf_backup.rel (file exists)
Backup boot image   : x510-main-20140113-2.rel (file exists)
Default boot config : flash:/default.cfg (file exists)
Current boot config : flash:/abc.cfg (file exists)
Backup boot config  : flash:/xyz.cfg (file exists)

Software Licenses :
Repository file    : ../configs/.sw_v2.lic
                  : ../configs/.swfeature.lic
Certificate file   : card:/atmf/lok/nodes/awplus1/flash/.atmf-lic-cert
```

Related commands **show atmf provision nodes**

atmf provision node locate

This command changes the present working directory to the directory of a provisioned node. This makes it easier to edit files and create a unique provisioned node in the backup.

This command can only be run on amf master nodes.

Syntax `atmf provision node <nodename> locate`

Parameter	Description
<nodename>	The name of the provisioned node.

Mode Privileged Exec

Usage This command is only available on master nodes in the AMF network. The command will only work if the provisioned node specified in the command has already been set up. Otherwise, an error message is shown when the command is run.

Note We advise that after running this command, you return to a known working directory, typically flash.



Example To change the working directory that happens to be on switch1 to the directory of provisioned node switch2, use the following command:

```
switch1# atmf provision node switch2 locate
```

The directory of the node switch2 should now be the working directory. You can use the command **pwd** to check this, as shown in the following figure.

Figure 6: Sample output from the pwd command

```
switch2#pwd
card:/atmf/building_2/nodes/switch2/flash
```

The output above shows that the working directory is now the flash of switch2.

Related commands [atmf provision node create](#)
[atmf provision node clone](#)
[pwd](#)

atmf reboot-rolling

This command enables you to reboot the nodes in an AMF working-set, one at a time, as a rolling sequence in order to minimize downtime. Once a rebooted node has finished running its configuration and its ports are up, it re-joins the AMF network and the next node is rebooted.

By adding the url parameter, you can also upgrade your switches' software one AMF node at a time.

The force command enforces a node reboot even if a previous node does not rejoin the AMF network. In this situation the unsuitable node will time-out and the rolling reboot process stops. However, with the **force** parameter applied, the process will ignore the timeout and move on to reboot the next node in the sequence.

This command can take a significant amount of time to complete.

Syntax `atmf reboot-rolling [force] [<url>]`

Parameter	Description
force	Ignore a failed node and move on to the next node. Where a node fails to reboot a timeout is applied based on the time taken during the last reboot.
<url>	The URL path to the software upgrade file.

Mode Privileged Exec


Usage You can load the software from a variety of locations. The latest compatible release for a node will be selected from your selected location - based on the parameters and URL you have entered.

For example `card:/5.4.3/x*-5.4.3-*.rel` will select from the folder `card:/5.4.3` the latest file that matches the selection `x` (wildcard) `-5.4.3-` (wildcard) `.rel`. Because `x*` is applied, each switch type will be detected and its appropriate release file will be installed.

Other allowable entries are:


- `card:*.rel`:
Used when loading SW from SD cards.
- `tftp:ip address`:
Used when loading SW from a TFTP server.
- `usb`:
Used when loading SW from a USB flash drive.
- `flash`:
Used when loading SW from flash memory, i.e. from one x900 switch to another.
- `scp`:
Used when loading SW from a secure copy.
- `http`:
Used when loading SW from an HTTP file server site.

Several checks are performed to ensure the upgrade will succeed. These include checking the current node release boots from flash. If there is enough space on flash, the software release is copied to flash to a new location on each node as it is processed. The new release name will be updated using the "boot system <release-name>" command, and the old release will become the backup release file.

Note  If you are using TFTP or HTTP, for example, to access a file on a remote device then the URL should specify the exact release filename without using wild card characters.

On bootup the software release is verified. Should an upgrade fail, the upgrading unit will revert back to its previous software version. At the completion of this command, a report is run showing the release upgrade status of each node.

This function is supported on the following switches: AT-SBx908, SBx8100 Series, x610 Series, x510 Series and AT-IX5-28GPX. It is supported on all stack configurations.

Note  Take care when removing external media or rebooting your switches. Removing an external media while files are being written entails a significant risk of causing a file corruption.

Example 1 To reboot all x510 nodes in an AMF network, use the following command:

```
Bld2_Floor_1# atmf working-set group x510
```

This command returns the following type of screen output:

```
=====
node1, node2, node3:
=====

Working set join
AMF_NETWORK_Name[3]#
```

```
ATMF_NETWORK[3]# atmf reboot-rolling
```

When the reboot has completed, a number of status screens appear. The selection of these screens will depend on the parameters set.

```
Bld2_Floor_1#atmf working-set group x510

=====
SW_Team1, SW_Team2, SW_Team3:
=====

Working set join

ATMF_NETWORK[3]#atmf reboot-rolling
ATMF Rolling Reboot Nodes:

Node Name                Timeout
                        (Minutes)
-----
SW_Team1                  14
SW_Team2                   8
SW_Team3                   8
Continue the rolling reboot ? (y/n):y
=====
ATMF Rolling Reboot: Rebooting SW_Team1
=====

% SW_Team1 has left the working-set
Reboot of SW_Team1 has completed
=====
ATMF Rolling Reboot: Rebooting SW_Team2
=====

% SW_Team2 has left the working-set
Reboot of SW_Team2 has completed
=====
ATMF Rolling Reboot: Rebooting SW_Team3
=====

% SW_Team3 has left the working-set
Reboot of SW_Team3 has completed

=====
ATMF Rolling Reboot Complete
Node Name                Reboot Status
-----
SW_Team1                  Rebooted
SW_Team2                  Rebooted
SW_Team3                  Rebooted
=====
```


Example 2 To update firmware releases, use the following command:

```
Node_1# atmf working-set group all

ATMF_NETWORK[9]# atmf reboot-rolling card:/5.4.3/x*-5.4.3-*.rel
```

ATMF Rolling Reboot Nodes:

Node Name	Timeout (Minutes)	New Release File	Status
SW_Team1	8	x510-5.4.3-0.5.rel	Release Ready
SW_Team2	10	x510-5.4.3-0.5.rel	Release Ready
SW_Team3	8	---	Not Supported
HW_Team1	6	---	Incompatible
Bld2_Floor_1	6	x900-5.4.3-0.5.rel	Release Ready
Bld1_Floor_2	2	x610-5.4.3-0.5.rel	Release Ready
Bld1_Floor_1	4	---	Incompatible
Building_1	2	---	Incompatible
Building_2	2	x900-5.4.3-0.5.rel	Release Ready

Continue upgrading releases ? (y/n):

atmf recover

This command is used to manually initiate the recovery (or replication) of an AMF node, usually when a node is being replaced. The recovery/replication process involves loading the configuration file for a node that is either about to be replaced or has experienced some problem. The configuration file of the device being replaced is selected by the `nodename` parameter, and the master node holding the configuration file is specified by the parameter `<master-nodename>`.

If the `<nodename>` parameter is not entered then the node will attempt to use one that has been previously configured. If the replacement node has no previous configuration (and has no previously used `nodename`), then the recovery will fail.

If the `<master-nodename>` parameter is not specified then the device will poll all known AMF masters and execute an election process (based on the last successful backup and its timestamp) to determine which master node to use. If no valid backup master is found, then this command will fail.

Syntax `atmf recover [<nodename> <master-nodename>]`

Parameter	Description
<code><nodename></code>	The name of the device whose configuration is to be recovered or replicated.
<code><master-nodename></code>	The name of the master device that holds the required configuration information. Note that although you can omit both the <code>nodename</code> and the <code>master nodename</code> ; you can only omit the <code>master nodename</code> if you also omit the <code>nodename</code> .

Mode Privileged Exec

Usage No error checking occurs when this command is run, and regardless of the last backup status, the recovering node will attempt to load its configuration from the master node specified by the `master-nodename` parameter.

Note that if the node has previously been configured, we recommend that you suspend any AMF backup before running this command. This is to prevent corruption of the backup files on the AMF master as it attempts to both backup and recover the node at the same time.

Example To recover the AMF node named `Node_10` from the AMF master node named `Master_2`, use the following command:

```
Master_2# atmf recover Node_10 Master_2
```

Related Commands [atmf backup stop](#)
[show atmf backup](#)
[show atmf](#)

atmf recover led-off

This command turns off the recovery failure flashing port LEDs. It reverts the LED's function to their normal operational mode, and in doing so assists with resolving the recovery problem. You can repeat this process until the recovery failure has been resolved. For more detailed information see [“Recovery progress indication” on page 145](#).

Syntax atmf recover led-off

Default Normal operational mode

Mode Privileged Exec

Example To revert the LEDs on Node1 from recovery mode display, to their normal operational mode, use the command:

```
Node1# atmf recover led-off
```

Related Commands [atmf recover](#)

atmf remote-login

Use this command to remotely login to other AMF nodes in order to run commands as if you were a local user of that node.

Syntax `atmf remote-login [user <name>] <nodename>`

Parameter	Description
<name>	User name.
<nodename>	Node name.

Mode Privileged Exec (This command will only run at privilege level 15)

Usage You do not need a valid login on the local device in order to run this command. The session will take you to the enable prompt on the new device. If the remote login session exits for any reason (i.e. device reboot) you will be returned to the originating node.

The software will not allow you to run multiple remote login sessions. You must exit an existing session before starting a new one.

Example 1 To remotely login from node Node10 to Node20 use the following command:

```
Node10# atmf remote-login node20
```

Example 2 In this example, user Whitney is a valid user of node5. She can remotely login from node5 to node3 by using the following commands:

```
node5# atmf remote-login user whitney
node3

Type 'exit' to return to node5#

node3> enable
```

Note In the above example the user name whitney is valid on both nodes.



Therefore, to prevent unauthorized access, user names should be unique across all nodes within the AMF network.

atmf restricted-login

This command restricts the use of the “**atmf working-set**” on [page 210](#) command on all AMF master nodes to privilege 15 users only. Once entered on any AMF master node, this command will propagate across the network.

Note that once you have run this command, certain other commands that utilize the AMF working-set command, such as the **include**, **atmf reboot-rolling** and **show atmf group members** commands, will operate only on master nodes.


Use the **no** variant of this command to disable restricted login on the AMF network. This allows access to the **atmf working-set** command from any node in the AMF network.

Syntax `atmf restricted-login`
 `no atmf restricted-login`

Mode Privileged Exec

Default Master nodes operate with **atmf restricted-login** disabled.

Member nodes operate with **atmf restricted-login** enabled.

 **Note** The default conditions of this command vary from those applied by its “no” variant. This is because the restricted-login action is only applied by **master** nodes, and in the absence of a master node, the default is to apply the restricted action to all **member** nodes with AMF configured.

In the presence of a **master** node, its default of “atmf restricted-login disabled” will permeate to all its member nodes. Similarly, any change in this command’s status that is made on a master node, will also permeate to all its member nodes

Example To enable restricted login, use the command

```
Node_20(config)# atmf restricted-login node20
```

Validation Command **show atmf**

atmf virtual-link id ip remote-id remote-ip

This command creates one or more Layer 2 tunnels that enable AMF nodes to transparently communicate across a wide area network using Layer 2 connectivity protocols.

Once connected through the tunnel, the remote member will have the same AMF capabilities as a directly connected AMF member.

Use the **no** variant of this command to remove the specified virtual link.

Syntax `atmf virtual-link id <1-32> ip <a.b.c.d> remote-id <1-32> remote-ip <a.b.c.d>`
`no atmf virtual-link id <1-32>`


Parameter	Description
<code>ip</code>	The Internet Protocol (IP).
<code><a.b.c.d></code>	The IP address, of the local amf node (at its interface to the tunnel) entered in a.b.c.d format.
<code>remote-id</code>	The ID of the (same) tunnel that will be applied by the remote node. Note that this must match the local-id that is defined on the remote node. This means that (for the same tunnel) the local and remote tunnel IDs are reversed on the local and remote nodes.
<code><1-32></code>	The ID range 1-32.
<code>remote-ip</code>	The IP address of the remote node
<code><a.b.c.d></code>	The IP address, of the remote node (at its interface to the tunnel) entered in a.b.c.d format.

Mode Privileged Exec

Usage The Layer 2 tunnel that this command creates enables a local AMF session to appear to pass transparently across a Wide Area Network (WAN) such as the Internet. The addresses configured as the local and remote tunnel IP addresses must have IP connectivity to each other. If the tunnel is configured to connect a head office and branch office over the Internet, typically this would involve using some type of managed WAN service such as a site-to-site VPN. Tunnels are only supported using IPv4.

Configuration involves creating a local tunnel ID, a local IP address, a remote tunnel ID and a remote IP address. A reciprocal configuration is also required on the corresponding remote device. The local tunnel ID must be unique to the device on which it is configured.

The tunneled link may operate via external (non AlliedWare Plus) routers in order to provide wide area network connectivity. However in this configuration, the routers perform a conventional router to router connection. The protocol tunneling function is accomplished by the AMF nodes.

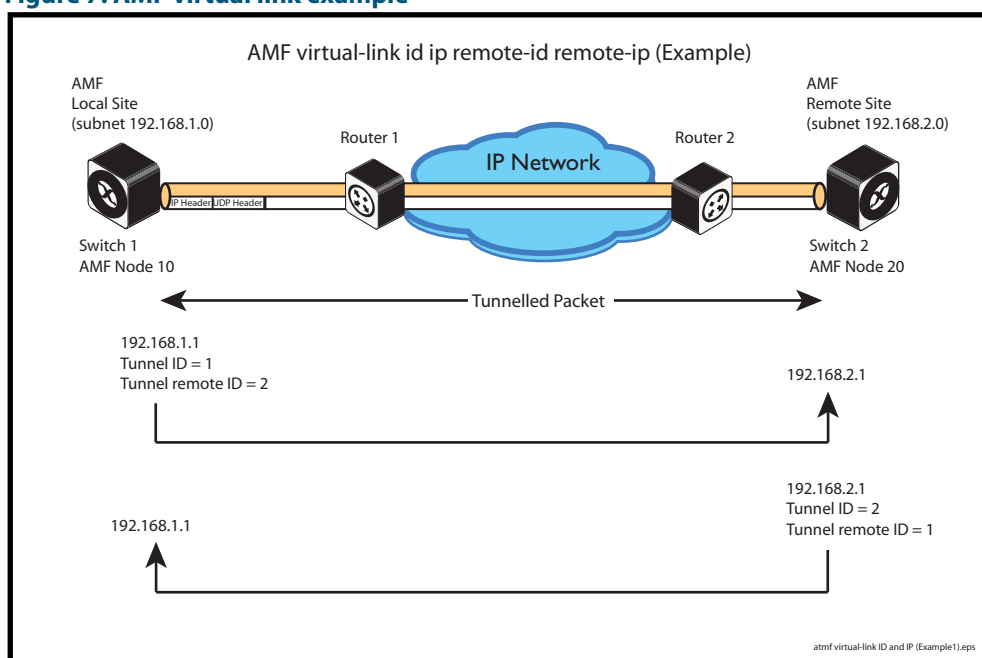
Note  The requirement to pre-configure the local IP address and tunnel ID on a device located at the far end of an AMF virtual-link tunnel means that zero touch device replacement cannot be achieved on a remote device that terminates the tunnel connection.

Example Use the following command to create the tunnel shown in figure [Figure 7 on page 209](#).

```
Node_10(config)# atmf virtual-link id 1 ip 192.168.1.1
                  remote-id 2 remote-ip 192.168.2.1

Node_20(config)# atmf virtual-link id 2 ip 192.168.2.1
                  remote-id 1 remote-ip 192.168.1.1
```

Figure 7: AMF virtual link example



Validation Command `show atmf`

atmf working-set

The AMF working-set command enables you to execute commands across an individually listed set (or preselected group) of AMF nodes. Group selection is made using the [atmf group \(membership\) command on page 179](#).

This command opens a session on multiple network devices. When you change the working set to anything other than the local device, the prompt will change to the AMF network name, followed by the size of the working set, shown in square brackets. This command has to be run at privilege level 15.

In addition to the user defined groups, the following system assigned groups are automatically created:

- Implicit Groups
 - « all - All nodes in the AMF
 - « current - All nodes that comprise the current working-set
 - « local - The originating node.
- Automatic Groups - These can be defined by hardware architecture, i.e. x510, x610, x900, x8100, or by certain AMF nodal designations such as master.

Note that the Implicit Groups do not appear in show group output.

If a node is an AMF master it will be automatically added to the master group.

Syntax `atmf working-set {[<node-list>] [group{<group-list>|all|local|current}]}`

Parameter	Description
<code><node-list></code>	A comma delimited list (without spaces) of nodes to be included in the working-set.
<code>group</code>	The AMF group.
<code><group-list></code>	A comma delimited list (without spaces) of groups to be included in the working-set. Note that this can include either defined groups, or any of the Automatic, or Implicit Groups shown earlier in the bulleted list of groups.
<code>all</code>	All nodes in the AMF.
<code>local</code>	Local node Running this command with the parameters group local will return you to the local prompt and local node connectivity.
<code>current</code>	Nodes in current list.

Default Needs to be entered

Mode Privileged Exec

Example 1 To add all nodes in the AMF to the working-set, use the command:

```
node1# atmf working-set group all
```


Note This command adds the implicit group “all” to the working set, where “all” comprises all nodes in the AMF.



This command displays an output screen similar to the one shown below:

```
=====
node1, node2, node3, node4, node5, node6:
=====

Working set join

ATMF_NETWORK_Name [ 6 ] #
```

Example 2 To return to the local prompt, and connectivity to only the local node; use the command:

```
ATMF_NETWORK_Name[6]# atmf working-set group local

node1#
```

Parameter	Description
node1, node2	The name of the nodes - as set by the hostname command.
ATMF_Network_Name	The name of the AMF network - as set by the atmf network-name command on page 187 .
[6]	The number of nodes in the working-set.

clear atmf links statistics

This command resets the values of all AMF link, port, and global statistics to zero.

Syntax clear atmf links statistics

Mode Privilege Exec

Example To reset the AMF link statistics values, use the command:

```
node_1# clear atmf links statistics
```

Related Commands [show atmf links statistics](#)

debug atmf

This command enables the AMF debugging facilities, and displays information that is relevant (only) to the current node. The detail of the debugging displayed depends on the parameters specified.

If no additional parameters are specified, then the command output will display all AMF debugging information, including link events, topology discovery messages and all notable AMF events.

The “no” variant of this command disables either all AMF debugging information, or only the particular information as selected by the command’s parameters.

Syntax `debug atmf [link|crosslink|database|neighbor|error|all]`
`no debug atmf [link|crosslink|database|neighbor|error|all]`

Parameter	Description
link	Output displays debugging information relating to uplink or downlink information.
crosslink	Output displays all crosslink events.
database	Output displays only notable database events.
neighbor	Output displays only notable AMF neighbor events.
error	Output displays AMF error events.
all	Output displays all AMF events.

Default All debugging facilities are disabled.

Mode User Exec and Global Configuration

Usage If no additional parameters are specified, then the command output will display all AMF debugging information, including link events, topology discovery messages and all notable AMF events.

Note



An alias to the no variant of this command is **“undebg atmf”** on [page 255](#).

Examples To debug all AMF debugging, use the command:

```
node_1# debug atmf
```

To debug all AMF link debugging, use the command:

```
node_1# debug atmf link
```

To debug all AMF crosslink debugging, use the command:

```
node_1# debug atmf crosslink
```

To debug all AMF database debugging, use the command:

```
node_1# debug atmf database
```

To debug all AMF neighbor debugging, use the command:

```
node_1# debug atmf neighbor
```

To debug all AMF error debugging, use the command:

```
node_1# debug atmf error
```

To debug all AMF facilities, use the command:

```
node_1# debug atmf all
```

Related Commands **no debug all**

debug atmf packet

This command configures AMF Packet debugging parameters. The debug only displays information relevant to the current node. The command has following parameters:

Syntax `debug atmf packet [[direction {rx|tx|both}] [level {1|2|3}] [timeout <seconds>] [num-pkts <quantity>] [filter node <name>] [interface <ifname>] [pkt-type {[1][2][3][4][5][6][7][8][9][10][11]}]`

Simplified Syntax

debug atmf packet		[direction {rx tx both}]
		[level {[1][2 3]}]
		[timeout <seconds>]
		[num-pkts <quantity>]
debug atmf packet	filter	[node <name>]
		[interface <ifname>]
		[pkt-type [1][2][3][4][5][6][7][8][9][10][11]]

Note You can combine the syntax components shown, but when doing so, you must retain their original order.



Default Level 1, both Tx and Rx, a timeout of 60 seconds with no filters applied.

Note An alias to the no variant of this command - **undebug atmf** - can be found elsewhere in this chapter.



Mode User Exec and Global Configuration

Usage If no additional parameters are specified, then the command output will apply a default selection of parameters shown below:

Parameter	Description
direction	Sets debug to packet received, transmitted, or both
rx	packets received by this node
tx	Packets sent from this node
1	AMF Packet Control header Information, Packet Sequence Number. Enter 1 to select this level.
2	AMF Detailed Packet Information. Enter 2 to select this level.
3	AMF Packet HEX dump. Enter 3 to select this level.
timeout	Sets the execution timeout for packet logging
<seconds>	Seconds
num-pkts	Sets the number of packets to be dumped

Parameter	Description
<code>pkts</code>	The actual number of packets
<code>filter</code>	Sets debug to filter packets
<code>node</code>	Sets the filter on packets for a particular Node
<code><name></code>	The name of the remote node
<code>interface</code>	Sets the filter to dump packets from an interface (portx.x.x) on the local node
<code>ifname</code>	Interface port or virtual-link
<code>pkt-type</code>	Sets the filter on packets with a particular AMF packet type
<code>1</code>	Crosslink Hello BPDU packet with crosslink links information. Enter 1 to select this packet type.
<code>2</code>	Crosslink Hello BPDU packet with downlink domain information. Enter 2 to select this packet type.
<code>3</code>	Crosslink Hello BPDU packet with uplink information. Enter 3 to select this packet type.
<code>4</code>	Downlink and uplink hello BPDU packets. Enter 4 to select this packet type.
<code>5</code>	Non broadcast hello unicast packets. Enter 5 to select this packet type.
<code>6</code>	Stack hello unicast packets. Enter 6 to select this packet type.
<code>7</code>	Database description. Enter 7 to select this packet type.
<code>8</code>	DBE request. Enter 8 to select this packet type.
<code>9</code>	DBE update. Enter 9 to select this packet type.
<code>10</code>	DBE bitmap update. Enter 10 to select this packet type.
<code>11</code>	DBE acknowledgment. Enter 11 to select this packet type.

Examples To set a packet debug on node 1 with level 1 and no timeout, use the command:

```
node_1# debug atmf packet direction tx timeout 0
```

To set a packet debug with level 3 and filter packets received from AMF node 1:

```
node_1# debug atmf packet direction tx level 3 filter  
node_1
```

To enable send and receive 500 packets only on vlink1 for packet types 1, 7, and 11, use the command:

```
node_1# debug atmf packet num-pkts 500 filter interface  
vlink1 pkt-type 1 7 11
```

Example This example applies the debug atmf packet command and combines many of its options:

```
node_1# debug atmf packet direction rx level 1 num-pkts  
60 filter node x900 interface port1.1.1 pkt-  
type 4 7 10
```

Note



In this example the local switch is an x8100 that is filtering traffic on its port 1.1.1 from a remote x900 switch.

erase factory-default

This command erases all data from NVS and all data from flash **excluding** the following:

- The current release file and its /flash/.release file
- The backup release file and /flash/.backup file
- v1 license files /flash/.configs/.swfeature.lic
- v2 license files /flash/.configs/.sw_v2.lic

The device is then rebooted and returns the switch to its factory default condition. The switch can then be used for automatic node recovery.

Syntax erase factory-default

Mode Global Configuration.

Usage This command is an alias to the [atmf cleanup command on page 174](#).

Example To erase data, use the command:

```
Node_1(config)# erase factory-default
```

```
This command will erase all NVS, all flash contents except  
for the boot release, and any license files, and then  
reboot the switch. Continue? (y/n):y
```

Related Commands [atmf cleanup](#)

show atmf

Displays information about the current AMF node.

Syntax `show atmf [summary|tech|nodes|session]`

Parameter	Description
summary	Displays summary information about the current AMF node.
tech	Displays global AMF information.
nodes	Displays a list of AMF nodes together with brief details.
session	Displays information on an AMF session.

Default Only summary information is displayed.

Mode User Exec and Privileged Exec

Usage AMF uses internal VLANs to communicate between nodes about the state of the AMF network. Two VLANs have been selected specifically for this purpose. Once these have been assigned, they are reserved for AMF and cannot be used for other purposes

Example 1 To show summary information on AMF node_1 use the following command:

```
node_1 show atmf summary
```

The following figure shows some example output from running this command for a specific AMF node.

Figure 8: Output from the show atmf summary command

```
node_1#show atmf
ATMF Summary Information:

ATMF Status           : Enabled
Network Name          : ATMF_NET
Node Name              : node_1
Role                   : Master
Current ATMF Nodes     : 8
```

Example 2 To show information specific to AMF nodes use the following command:

```
node_1 show atmf nodes
```


Figure 9: Output from the show atmf nodes command

```

Node Information:

* = Local device

SC = Switch Configuration:
C = Chassis   S = Stackable   N = Standalone

```

Node Name	Device Type	AMF Master	SC	Parent	Node Depth
Building_1	AT-SBx8112	Y	C	-	0
* Building_2	x900-12XT/S	Y	N	-	0
Bld1_Floor_1	SwitchBlade x908	N	S	Building_1	1
Bld1_Floor_2	x600-24Ts/XP	N	N	Building_1	1
Bld2_Floor_1	x610-24Ts-POE+	N	N	Building_1	1
SW_Team1	x510-28GPX	N	N	Bld1_Floor_2	2

```

Current AMF node count 8

```

The show AMF session command displays all CLI (Command Line Interface) sessions for users that are currently logged in and running a CLI session. For example, in the case below, node_1 and node5 have active users logged in.

Example 3 To display AMF active sessions, use the following command:

```
node_1 show atmf sessions
```

Figure 10: Output from the show atmf sessions command

```

node_1#show atmf session

CLI Session Neighbors

Session ID           : 73518
Node Name            : node_1
PID                  : 7982
Link type            : Broadcast-cli
MAC Address          : 0000.0000.0000
Options              : 0
Our bits             : 0
Link State           : Full
Domain Controller    : 0
Backup Domain Controller : 0
Database Description Sequence Number : 00000000
First Adjacency      : 1
Number Events        : 0
DBE Retransmit Queue Length : 0
DBE Request List Length : 0

Session ID           : 410804
Node Name            : node5
PID                  : 17588
Link type            : Broadcast-cli
MAC Address          : 001a.eb56.9020
Options              : 0
Our bits             : 0
Link State           : Full
Domain Controller    : 0
Backup Domain Controller : 0
Database Description Sequence Number : 00000000
First Adjacency      : 1
Number Events        : 0
DBE Retransmit Queue Length : 0
DBE Request List Length : 0

```

The AMF tech command collects all the AMF commands, and displays them. You can use this command when you want to see an overview of the AMF network.

Example 4 To display AMF technical information, use the following command:

```
node_1 show atmf tech
```

Figure 11: Output from the show atmf tech command

```
node_1#show atmf tech
ATMF Summary Information:

ATMF Status           : Enabled
Network Name          : ATMF_NET
Node Name              : node_1
Role                   : Master
Current ATMF Nodes    : 8

ATMF Technical information:

Network Name           : ATMF_NET
Domain                 : node_1's domain
Node Depth             : 0
Domain Flags           : 0
Authentication Type    : 0
MAC Address            : 0014.2299.137d
Board ID               : 287
Domain State           : DomainController
Domain Controller      : node_1
Backup Domain Controller : node2
Domain controller MAC   : 0014.2299.137d
Parent Domain          : -
Parent Domain Controller : -
Parent Domain Controller MAC : 0000.0000.0000
Number of Domain Events : 0
Crosslink Ports Blocking : 0
Uplink Ports Waiting on Sync : 0
Crosslink Sequence Number : 7
Domains Sequence Number : 28
Uplink Sequence Number  : 2
Number of Crosslink Ports : 1
Number of Domain Nodes  : 2
Number of Neighbors     : 5
Number of Non Broadcast Neighbors : 3
Number of Link State Entries : 1
Number of Up Uplinks     : 0
Number of Up Uplinks on This Node : 0
DBE Checksum            : 84fc6
Number of DBE Entries    : 0
Management Domain Ifindex : 4391
Management Domain VLAN   : 4091
Management ifindex       : 4392
Management VLAN          : 4092
```

Table 1: Parameter definitions from the show atmf tech command

Parameter	Definition
ATMF Status	The Node's AMF status, either Enabled or Disabled.
Network Name	The AMF network that a particular node belongs to.
Node Name	The name assigned to a particular node.
Role	The role configured for this AMF device, either Master or Member.
Current ATMF Nodes	The count of AMF nodes in an AMF Network.
Node Address	An Address used to access a remotely located node (.atmf).

Table 1: Parameter definitions from the show atmf tech command

Parameter	Definition
Node ID	A Unique identifier assigned to a Node on an AMF network.
Node Depth	The number of nodes in path from this node to level of the AMF root node. It can be thought of as the vertical depth of the AMF network from a particular node to the zero level of the AMF root node.
Domain State	The state of Node in a Domain in AMF network as Controller/Backup.
Recovery State	The AMF node recovery status. Indicates whether a node recovery is in progress on this device - Auto, Manual, or None.
Management VLAN	<p>The VLAN created for traffic between Nodes of different domain (up/down links).</p> <ul style="list-style-type: none"> ■ VLAN ID - In this example VLAN 4092 is configured as the Management VLAN. ■ Management Subnet - Network prefix for the subnet. ■ Management IP Address - The IP address allocated for this traffic. ■ Management Mask - The subnet mask used to create a subnet for this traffic (255.255.128.0).
Domain VLAN	<p>The VLAN assigned for traffic between Nodes of same domain (crosslink).</p> <ul style="list-style-type: none"> ■ VLAN ID - In this example VLAN 4091 is configured as the domain VLAN. ■ Domain Subnet. The subnet address used for this traffic. ■ Domain IP Address. The IP address allocated for this traffic. ■ Domain Mask. The subnet mask used to create a subnet for this traffic (255.255.128.0).
Device Type	The Product Series Name.
ATMF Master	The 'Y' if the node belongs to a Core domain.
SC	The Switch Configuration, C - Chassis(SBx81series), S - Stackable (VCS) and N - Standalone.
Parent	The a Node to which the current node has an active uplink.
Node Depth	The the number of nodes in path from this node to the Core domain.

Related Commands [show atmf detail](#)

show atmf backup

This command displays information about AMF backup status for all the nodes in an AMF network. It can only be run on amf master nodes.

Syntax `show atmf backup [logs|server-status|synchronize [logs]]`

Parameter	Description
logs	Displays detailed log information.
server-status	Displays connectivity diagnostics information for each configured remote file server.
synchronize	Display the file server synchronization status
logs	For each remote file server, display the logs for the last synchronization

Mode Privileged Exec

Example 1 To display the AMF backup information, use the command:

```
node_1# show atmf backup
```

```
Node_1# show atmf backup
ScheduledBackup .....Enabled
  Schedule.....1 per day starting at 03:00
  Next Backup Time...19 May 2012 03:00
Backup Media.....SD (Total 1974.0 MB, Free197.6MB)
Current Action.....Starting manual backup
Started.....18 May 2012 10:08
CurrentNode.....atmf_testbox1
```

Node Name	Date	Time	In ATMF	Status
atmf_testbox1	17May	2012 09:58:59	Yes	Errors
atmf_testbox2	17May	2012 10:01:23	Yes	Good

```
Node_1#show atmf backup logs

Log File Location: card:/atmf/office/logs/rsync_<nodename>.log

Node
Name Log Details-----
atmf_testbox2
  2012/05/22 03:41:32 [30299]File list size: 6199
  2012/05/22 03:41:32 [30299]File list generation time: 0.011 seconds
  2012/05/22 03:41:32 [30299]File list transfer time: 0.000 seconds
  2012/05/22 03:41:32 [30299]Total bytes sent: 696
  2012/05/22 03:41:32 [30299]Total bytes received: 16.03K
  2012/02/20 03:41:32 [30299]sent 696 bytes rece ived 16.03Kbytes 33.45 K
  bytes/sec
  2012/05/22 03:41:32 [30299]total size is 21.73M speedup is 1298.93
  2012/05/22 03:41:32 [30297]sent 626 bytes received 6203 bytes total
  size 43451648
```

Example 2 To display the AMF backup information with the optional parameter `server-status`, use the command:

```
Node_1# show atmf backup server-status
```

```
Node1#sh atmf backup server-status

Id  Last Check  State
-----
1      186 s  File server ready
2          1 s  SSH no route to host
```

Table 2: Parameter definitions from the show atmf backup server-status command

Parameter	Definition
Scheduled Backup	Indicates whether AMF backup scheduling is enabled or disabled.
Schedule	Displays the configured backup schedule.
Next Backup Time	Displays the date and time of the next scheduled.
Backup Media	The current backup medium in use. This will be one of USB, SD, or NONE. Note that the USB will take precedence over the SD card. Utilized and available memory (MB) will be indicated if backup media memory is present.
Current Action	The task that the AMF backup mechanism is currently performing. This will be a combination of either (Idle, Starting, Doing, Stopping), or (manual, scheduled).
Started	The date and time that the currently executing task was initiated in the format DD MMM YYYY.
Current Node	The name of the node that is currently being backed up.
Node Name	The name of the node that is storing backup data - on its backup media.
Date	The data of the last backup in the format DD MMM YYYY.
Time	The time of the last backup in the format HH:MM:SS.
In ATMF	Whether the node shown is active in the AMF network, (Yes or No).
Status	The output can contain one of four values: <ul style="list-style-type: none"> ■ "-" meaning that the status file cannot be found or cannot be read. ■ "Errors" meaning that there are issues - note that the backup may still be deemed successful depending on the errors. ■ "Stopped" meaning that the backup attempt was manually aborted;. ■ "Good" meaning that the backup was completed successfully.
Log File Location	All backup attempts will generate a result log file in the identified directory based on the node name. In the above example this would be: card:/amf/office/logs/rsync_amf_testbox1.log.
Log Details	The contents of the backup log file.
server-status	Displays connectivity diagnostics information for each configured remove file server.

Related Commands [show atmf atmf network-name](#)

show atmf detail

This command displays details about an AMF node. It can only be run on amf master nodes.

Syntax `show atmf [detail]`

Parameter	Description
detail	Displays output in greater depth.

Mode Privileged Exec

Example 1 To display the AMF node1 information in detail, use the command:

```
node1# show atmf detail
```

A typical output screen from this command is shown below:

```
node1#show atmf detail
ATMF Detail Information

Network Name           : ATMF_NET
Node Name              : Admin2
Node Address           : Admin2.atmf
Node ID               : 15
Node Depth             : 0
Domain State           : DomainController
Recovery State         : None

Management VLAN
VLAN ID                : 4092
Management Subnet      : 172.31.0.0
Management IP Address  : 172.31.0.1
Management Mask        : 255.255.128.0

Domain VLAN
VLAN ID                : 4091
Domain Subnet          : 172.31.128.0
Domain IP Address      : 172.31.128.1
Domain Mask            : 255.255.128.0
```

Table 3: Parameter definitions from the show atmf details command

Parameter	Definition
ATMF Status	The Node's AMF status, either Enabled or Disabled.
Network Name	The AMF network that a particular node belongs to.
Node Name	The name assigned to a particular node.
Role	The role configured for this AMF device, either Master or Member.
Current ATMF Nodes	The count of AMF nodes in an AMF Network.
Node Address	An Address used to access a remotely located node. This is simply the Node Name plus the dotted suffix atmf (.atmf).
Node ID	A Unique identifier assigned to a Node on an AMF network.
Node Depth	The number of nodes in path from this node to level of the AMF root node. It can be thought of as the vertical depth of the AMF network from a particular node to the zero level of the AMF root node.

Table 3: Parameter definitions from the show atmf details command

Parameter	Definition
Domain State	The state of Node in a Domain in AMF network as Controller/Backup.
Recovery State	The AMF node recovery status. Indicates whether a node recovery is in progress on this device - Auto, Manual, or None.
Management VLAN	<p>The VLAN created for traffic between Nodes of different domain (up/down links).</p> <ul style="list-style-type: none"> ■ VLAN ID - In this example VLAN 4092 is configured as the Management VLAN. ■ Management Subnet - Network prefix for the subnet. ■ Management IP Address - The IP address allocated for this traffic. ■ Management Mask - The subnet mask used to create a subnet for this traffic (255.255.128.0).
Domain VLAN	<p>The VLAN assigned for traffic between Nodes of same domain (crosslink).</p> <ul style="list-style-type: none"> ■ VLAN ID - In this example VLAN 4091 is configured as the domain VLAN. ■ Domain Subnet. The subnet address used for this traffic. ■ Domain IP Address. The IP address allocated for this traffic. ■ Domain Mask. The subnet mask used to create a subnet for this traffic (255.255.128.0).
Device Type	The Product Series Name.
ATMF Master	'Y' if the node belongs to a Core domain.
SC	The Switch Configuration, C - Chassis(SBx81series), S - Stackable (VCS) and N - Standalone.
Parent	The a Node to which the current node has an active uplink.
Node Depth	The number of nodes in the path from this node to the Core domain.

show atmf group

This command can be used to display the group membership within to a particular AMF node. It can also be used with the working-set command to display group membership within a working set.

Each node in the AMF is automatically added to the group that is appropriate to its hardware architecture, e.g. x510, x610. Nodes that are configured as masters are automatically assigned to the master group.

You can create arbitrary groups of AMF members based on your own selection criteria. You can then assign commands collectively to any of these groups.

Syntax `show atmf group [user-defined|automatic]`

Parameter	Description
<code>user-defined</code>	User-defined-group information display.
<code>automatic</code>	Automatic group information display.

Default All groups are displayed

Mode Privileged Exec

Example 1 To display group membership of node2, use the following command:

```
node2# show atmf group
```

A typical output screen from this command is shown below:

```
ATMF group information
master, x510
node2#
```

This screen shows that node2 contains the groups, master and x510. Note that although the node also contains the implicit groups, these do not appear in the show output.

Example 2 The following commands (entered on node2) will display all the automatic groups within the working set containing node-1 and all nodes that have been pre-defined to contain the sysadmin group:

First define the working-set:

```
Node-1# #atmf working-set node-1 group sysadmin
```


A typical output screen from this command is shown below:

```
ATMF group information
master, poe, x8100

=====
node-1, node-2, node33, node-4, node-5, node-6:
=====

ATMF group information
sysadmin, x8100
ATMF-Test-NETWORK[6]#
```

This confirms that the six nodes (node_1 to node6) are now members of the working-set and that these nodes reside within the AMF-Test-Network.

Note that to run this command, you must have previously entered the command **“atmf working-set” on page 210**. This can be seen from the network level prompt, which in this case is, ATM_Network[6]#.

Figure 12: Sample output from the show atmf group command for a working set.

```
ATMF_NETWORK[6]#show atmf group
=====
node3, node4, node5, node6:
=====

ATMF group information
edge_switches, x510
```

Table 4: Parameter definitions from the show atmf group command for a working set

Parameter	Definition
ATMF group information	<p>Displays a list of nodes and the groups that they belong to, for example:</p> <ul style="list-style-type: none"> ■ master - Shows a common group name for Nodes configured as AMF masters. ■ Hardware Arch - Shows a group for all Nodes sharing a common Hardware architecture, e.g. x8100, x900, x610, for example. ■ User-defined - Arbitrary groups created by the user for AMF nodes.

show atmf group members

This command will display all group memberships within an AMF working-set. Each node in the AMF working set is automatically added to automatic groups which are defined by hardware architecture, e.g. x510, x610. Nodes that are configured as masters are automatically assigned to the master group. User can define arbitrary groupings of AMF members based on their own criteria, which can be used to select groups of nodes.

Syntax `show atmf group members [user-defined|automatic]`

Parameter	Description
user-defined	User defined group membership display.
automatic	Automatic group membership display.

Mode Privileged Exec

Example To display group membership of all nodes in a working-set, use the command:

```
ATMF_NETWORK[9]# show atmf group members
```

Figure 13: Sample output from the show atmf group members command

ATMF Group membership		
Automatic Groups	Total Members	Members

master	1	Building_1
poe	1	HW_Team1
x510	3	SW_Team1 SW_Team2 SW_Team3
x900	1	Bld1_Floor_2
x610	1	HW_Team1
x8100	2	Building_1 Building_2
ATMF Group membership		
User-defined Groups	Total Members	Members

marketing	1	Bld1_Floor_1
software	3	SW_Team1 SW_Team2 SW_Team3

Table 5: Parameter definitions from the show atmf group members command

Parameter	Definition
Automatic Groups	Lists the Automatic Groups and their nodal composition. The sample output shows AMF nodes based on same Hardware type or belonging to same Master group.
User-defined Groups	Shows grouping of AMF nodes in user defined groups.
Total Members	Shows the total number of members in each group.
Members	Shows the list of AMF Nodes in each group.

Related Commands [show atmf group](#)
[show atmf](#)
[atmf group \(membership\)](#)

show atmf links

This command displays brief information about AMF links on a switch, such as link status and adjacent nodes.

Provisioned node names will be displayed with a trailing * character, and will not have an entry under Adjacent Ifindex.

This command can only be run on amf master nodes.

Syntax show atmf links

Mode User Exec and Privileged Exec

Example To display the AMF links brief details, use the following command:

```
switch1# show atmf links brief
```

Figure 14: Sample output from the show atmf links command


```
switch1# show atmf links brief
```

ATMF Links Brief:						
Local Port	Link Type	Port Status	ATMF State	Adjacent Node	Adjacent Ifindex	Link State
sa1	Crosslink	Up	TwoWay	Building_1	4501	Forwarding
1.1.1	Downlink	Up	Full	Bld1_Floor_1	5001	Forwarding
1.1.2	Downlink	Up	Full	Bld1_Floor_2	5003	Forwarding
1.1.3	Downlink	Up	Full	Bld2_Floor_1	6101	Forwarding
1.1.4	Crosslink	Down	Init	*switch3		Blocking

* = provisioned

Table 6: Parameter definitions from the show atmf links brief command output

Parameter	Definition
Local Port	Shows local port on the Node configured for AMF Network.
Link Type	Shows link type as Uplink/Downlink (parent and child) or Cross-link (nodes in same domain).
Port Status	Shows status of the local port on the Node as UP/DOWN.
ATMF State	Shows AMF state of the local port: <ul style="list-style-type: none"> Init - Link is down. Hold - Link transitioned to up state, but waiting for hold period to ensure link is stable. Incompatible - Neighbor rejected the link because of inconsistency in AMF configurations. OneWay - Link is up and has waited the hold down period and now attempting to link to another unit in another domain Full - Link hello packets are sent and received from its neighbor with its own node id. Shutdown - Link has been shut down by user configuration.
Adjacent Node	Shows Adjacent AMF Node to this Node.
Adjacent IfIndex	Shows interface on the Adjacent AMF Node connected to this Node.
Link State	Shows state of AMF link Forwarding/Blocking.

Note  You can manage your show output, or make it more selective, by using a command modifier. For information on using show-command modifiers, see **“Controlling “show” Command Output”** in the “Getting Started” chapter of your switch’s Software Reference.

Related Commands

- no debug all**
- clear atmf links statistics**
- show atmf**
- show atmf nodes**

show atmf links detail

This command displays detailed information on all the links configured in the AMF network. It can only be run on amf master nodes.

Syntax `show atmf links [detail]`

Parameter	Description
detail	Detailed AMF links information.

Mode User Exec

Example To display the AMF link details use this command:

```
switch1# show atmf links detail
```

The output from this command will display all the internal data held for AMF links.

Figure 15: Sample output from the show atmf links detail command

```
switch1# show atmf links details

ATMF Links Detail:

Port                : sa1
Ifindex             : 4501
VR ID               : 0
Port Status         : Up
Port State          : Full
Port BPDU Receive Count : 44441
Adjacent Node Name  : Building_2
Adjacent Ifindex    : 4501
Adjacent VR ID      : 0
Adjacent MAC        : 0014.2299.137d
Port Last Message Response : 0
```

Figure 15: Sample output from the show atmf links detail command (cont.)

Port	: port2.0.2
Ifindex	: 6002
VR ID	: 0
Port Status	: Down
Port State	: Init
Port BPDU Receive Count	: 0
Link State Entries:	
Node.Ifindex	: Building_2.4501 -
Building_1.4501	
Transaction ID	: 3 - 3
MAC Address	: 0014.2299.137d -
eccd.6d03.10e3	
Link State	: Full - Full
Domain Nodes Tree:	
Node	: Building_2
Links on Node	: 1
Link 0	: Building_2.4501 -
Building_1.4501	
Forwarding State	: Forwarding
Node	: Building_1
Links on Node	: 1
Link 0	: Building_2.4501 -
Building_1.4501	
Forwarding State	: Forwarding
Crosslink Transaction Entries:	
Node	: Building_2
Transaction ID	: 3
Uplink Transaction ID	: 3
Uplink Information:	
Waiting for Sync	: 0
Transaction ID	: 3
Number of Links	: 0
Number of Local Uplinks	: 0
Uplink Information:	
Waiting for Sync	: 0
Transaction ID	: 3
Number of Links	: 0
Number of Local Uplinks	: 0
Originating Node	: Building_2
Domain	: -'s domain
Node	: Building_2
Ifindex	: 0
VR ID	: 0
Transaction ID	: 3
Flags	: 32
Domain Controller	: -
Domain Controller MAC	: 0000.0000.0000

Figure 15: Sample output from the show atmf links detail command (cont.)

```

Downlink Domain Information:

Domain                               : Bld2_Floor_1's domain
Domain Controller                    : Bld2_Floor_1
Domain Controller MAC                : eccd.6d3f.fef7
Number of Links                      : 2
Number of Links Up                   : 2
Number of Links on This Node        : 1
Links are Blocked                    : 0
Node Transaction List
Node                                : Building_2
Transaction ID                      : 7
Domain List
Domain                               : Bld2_Floor_1's domain
Node                                : Building_2
Ifindex                             : 5002
Transaction ID                      : 7
Flags                               : 1

Domain                               : Bld2_Floor_1's domain
Node                                : Building_1
Ifindex                             : 7002
Transaction ID                      : 7
Flags                               : 1

```

```

-----
Up/Downlink Ports Information
-----

```

```

Port                               : port1.3.1
Ifindex                           : 7001
VR ID                             : 0
Port Status                       : Up
Port State                        : Full
Adjacent Node                     : Bld1_Floor_1
Adjacent Internal ID              : 4
Adjacent Ifindex                  : 6001
Adjacent Board ID                 : 290
Adjacent VR ID                    : 0
Adjacent MAC                      : 0000.cd37.0ea4
Adjacent Domain Controller        : Bld1_Floor_1
Adjacent Domain Controller MAC    : 0000.cd37.0ea4
Port Forwarding State             : Blocking
Port BPDU Receive Count           : 0
Port Sequence Number              : 12
Port Adjacent Sequence Number     : 9
Port Last Message Response        : 0

```

```

Port                               : port1.3.2
Ifindex                           : 7002
VR ID                             : 0
Port Status                       : Up
Port State                        : Full
Adjacent Node                     : Bld2_Floor_1
Adjacent Internal ID              : 3
Adjacent Ifindex                  : 5001
Adjacent Board ID                 : 333
Adjacent VR ID                    : 0
Adjacent MAC                      : eccd.6d3f.fef7
Adjacent Domain Controller        : Bld2_Floor_1
Adjacent Domain Controller MAC    : eccd.6d3f.fef7
Port Forwarding State             : Blocking
Port BPDU Receive Count           : 0
Port Sequence Number              : 15
Port Adjacent Sequence Number     : 8
Port Last Message Response        : 0

```

Table 7: Parameter definitions from the show atmf links detail command output

Parameter	Definition
Port Status	Shows status of the local port on the Node as UP/DOWN.
Adjacent Node	Shows Adjacent AMF Node to this Node.
Adjacent IfIndex	Shows interface on the Adjacent AMF Node connected to this Node.
Link State	Shows state of AMF link Forwarding/Blocking.
Crosslink Ports Information	Show details of all Crosslink ports on this Node: <ul style="list-style-type: none"> ■ Port - Name of the Port or static aggregation (sa<*>). ■ Ifindex - Interface index for the crosslink port. ■ VR ID - Virtual router id for the crosslink port. ■ Port Status - Shows status of the local port on the Node as UP/DOWN. ■ Port State - Same as AMF state as described above. ■ Port BPDU Receive Count - The number of AMF protocol PDU's received. ■ Adjacent Node Name - name of the adjacent node in the domain. ■ Adjacent Ifindex - Ifindex of the adjacent node in the domain. ■ Adjacent VR ID - Virtual router id of the adjacent node in the domain. ■ Adjacent MAC - MAC address of the adjacent node in the domain. ■ Port Last Message Response - Response from the remote neighbor to our AMF last hello packet.
Link State Entries	Show all the link state database entries: <ul style="list-style-type: none"> ■ Node.Ifindex - Shows adjacent Node names and Interface index. ■ Transaction ID - Shows transaction id of the current crosslink transaction. ■ MAC Address - Shows adjacent Node MAC addresses. ■ Link State - Shows AMF states of adjacent nodes on the link.
Domain Nodes Tree	Shows all the nodes in the domain: <ul style="list-style-type: none"> ■ Node - Name of the node in the domain. ■ Links on Node - Number of crosslinks on a vertex/node. ■ Link no - Shows adjacent Node names and Interface index. ■ Forwarding State - Shows state of AMF link Forwarding/Blocking.
Crosslink Transaction Entries	Shows all the transaction entries: <ul style="list-style-type: none"> ■ Node - Name of the AMF node. ■ Transaction ID - transaction id of the node. ■ Uplink Transaction ID - transaction id of the remote node.

Table 7: Parameter definitions from the show atmf links detail command output(cont.)

Parameter	Definition
Uplink Information	<p>Show all uplink entries.</p> <ul style="list-style-type: none"> ■ Waiting for Sync - Flag if uplinks are currently waiting for synchronization. ■ Transaction ID - Shows transaction id of the local node. ■ Number of Links - Number of up downlinks in the domain. ■ Number of Local Uplinks - Number of uplinks on this node to the parent domain. ■ Originating Node - Node originating the uplink information. ■ Domain - Name of the parent uplink domain. ■ Node - Name of the node in the parent domain, that is connected to the current domain. ■ Ifindex - Interface index of the parent node's link to the current domain. ■ VR ID - Virtual router id of the parent node's link to the current domain. ■ Transaction ID - Transaction identifier for the neighbor in crosslink. ■ Flags - Used in domain messages to exchange the state: <ul style="list-style-type: none"> ■ATMF_DOMAIN_FLAG_DOWN = 0 ■ATMF_DOMAIN_FLAG_UP = 1 ■ATMF_DOMAIN_FLAG_BLOCK = 2 ■ATMF_DOMAIN_FLAG_NOT_PRESENT = 4 ■ATMF_DOMAIN_FLAG_NO_NODE = 8 ■ATMF_DOMAIN_FLAG_NOT_ACTIVE_PARENT = 16 ■ATMF_DOMAIN_FLAG_NOT_LINKS = 32 ■ATMF_DOMAIN_FLAG_NO_CONFIG = 64 ■ Domain Controller - Domain Controller in the uplink domain ■ Domain Controller MAC - MAC address of Domain Controller in uplink domain
Downlink Domain Information	<p>Shows all the downlink entries:</p> <ul style="list-style-type: none"> ■ Domain - Name of the downlink domain. ■ Domain Controller - Controller of the downlink domain. ■ Domain Controller MAC - MAC address of the domain controller. ■ Number of Links - Total number of links to this domain from the Node. ■ Number of Links Up - Total number of links that are in UP state. ■ Number of Links on This Node - Number of links terminating on this node. ■ Links are Blocked - 0 links are not blocked to the domain. 1 All links are blocked to the domain.
Node Transaction List	<p>List of transactions from this downlink domain node.</p> <ul style="list-style-type: none"> ■ Node - 0 links are not blocked to the domain. 1 All links are blocked to the domain. ■ Transaction ID - Transaction id for this node. ■ Domain List: Shows list of nodes in the current domain and their links to the downlink domain.: ■ Domain - Domain name of the downlink node. ■ Node - Name of the node in the current domain. ■ Ifindex - Interface index for the link from the node to the downlink domain. ■ Transaction ID - Transaction id of the node in the current domain. ■ Flags - As mentioned above.

Table 7: Parameter definitions from the show atmf links detail command output(cont.)

Parameter	Definition
Up/Downlink Ports Information	<p>Shows all the configured up and down link ports on this node:</p> <ul style="list-style-type: none"> ■ Port - Name of the local port. ■ Ifindex - Interface index of the local port. ■ VR ID - Virtual router id for the local port. ■ Port Status - Shows status of the local port on the Node as UP/DOWN. ■ Port State - AMF state of the local port. ■ Adjacent Node - nodename of the adjacent node. ■ Adjacent Internal ID - Unique node identifier of the remote node. ■ Adjacent Ifindex - Interface index for the port of adjacent AMF node. ■ Adjacent Board ID - Product identifier for the adjacent node. ■ Adjacent VR ID - Virtual router id for the port on adjacent AMF node. ■ Adjacent MAC - MAC address for the port on adjacent AMF node. ■ Adjacent Domain Controller - nodename of the Domain controller for Adjacent AMF node. ■ Adjacent Domain Controller MAC - MAC address of the Domain controller for Adjacent AMF node. ■ Port Forwarding State - Local port forwarding state Forwarding or Blocking. ■ Port BPDU Receive Count - count of AMF protocol PDU's received. ■ Port Sequence Number - hello sequence number, incremented every time the data in the hello packet changes. ■ Port Adjacent Sequence Number - remote ends sequence number used to check if we need to process this packet or just note it arrived. ■ Port Last Message Response - response from the remote neighbor to our last hello packet.

Related Commands **no debug all**
clear atmf links statistics
show atmf

show atmf links statistics

This command displays details of the AMF links configured on the device and also displays statistics about the AMF packet exchanges between the devices.

It is also possible to display the AMF link configuration and packet exchange statistics for a specified interface.

This command can only be run on amf master nodes

Syntax `show atmf links statistics [interface [<port_number>]]`

Parameter	Description
interface	Specifies that the command applies to a specific interface (port) or range of ports. Where both the interface and port number are unspecified, full statistics (not just those relating to ports) will be displayed.
<port_number>	Enter the port number for which statistics are required. A port range or a static channel can also be specified. Where no port number is specified, statistics will be displayed for all ports on the switch.

Mode User Exec

Example 1 To display AMF link statistics for the whole switch, use the command:

```
switch1# show atmf links statistics
```

Figure 16: Sample output from the show atmf links statistics command

```
switch1# show atmf links statistics
```

ATMF Statistics:

	Receive	Transmit
Crosslink Hello	7	14
Crosslink Hello Domain	18	38
Crosslink Hello Uplink	3	12
Hello Link	32	31
Hello Neighbor	55	57
Hello Stack	0	0
Database Description	12	112
Database Request	5	4
Database Reply	0	5
Database Update	35	9
Database Update Bitmap	0	10
Database Acknowledge	112	74
Transmit Fails	0	0
Discards	0	0
Total AMF Packets	300	366

ATMF Database Statistics:

Database Entries	18
Database Full Ages	0

ATMF Packet Discards:

Type0	0	Type1	0	Type2	0
Type3	0	Type4	0	Type5	0
Type6	0	Type7	0	Type8	0
Type9	0	Type10	0	Type11	0
Type12	0	Type13	0	Type14	0
Type15	0	Type16	0	Type17	0
Type18	0	Type19	0	Type20	0
Type21	0	Type22	0		

ATMF Virtual Link Statistics

Virtual Link	Receive	Receive Dropped	Transmit	Transmit Dropped
vlink1	0	0	0	0
vlink2	97383	0	36260	0
vlink6	0	3991	0	0
vlink16	0			

Example 2 To display the AMF links statistics on interface port1.1.5, use the command:

```
switch1# show atmf links statistics interface
port1.1.5
```

Figure 17: Sample output from the show atmf links statistics command for interface 1.1.5

```
switch1# show atmf links statistics interface port1.1.5
```

ATMF Port Statistics:

	Transmit	Receive
port1.1.5 Crosslink Hello	231	232
port1.1.5 Crosslink Hello Domain	116	116
port1.1.5 Crosslink Hello Uplink	116	115
port1.1.5 Hello Link	0	0

Table 8: Parameter definitions from the show atmf links statistics command output

Parameter	Definition
Receive	Shows a count of AMF protocol packets received per message type.
Transmit	Shows the number of AMF protocol packets transmitted per message type.
Database Entries	Shows the number of AMF elements existing in the distributed database.
Database Full Ages	Shows the number of times the entries aged in the database.
ATMF Packet Discards	Shows the number of discarded packets of each type: <ul style="list-style-type: none"> ■ Type0: The number of discarded crosslink hello msgs received on a non crosslink port. ■ Type1: The number of discarded tx update packets - bad checksum. ■ Type2: The number of discarded tx update bitmap packets - bad checksum. ■ Type3: The number of discarded tx update packets - neighbor not in the correct state. ■ Type4: The number of discarded update packets - bad checksum. ■ Type5: The number of discarded update packets - neighbor not in the correct state. ■ Type6: The number of discarded update bitmap packets - bad checksum. ■ Type7: The number of discarded crosslink hello msgs received on a non crosslink port. ■ Type8: The number of discarded crosslink hello msg received on a port that is not in the correct state. ■ Type9: The number of discarded crosslink domain hello msgs received on a non crosslink port. ■ Type10: The number of discarded crosslink domain hello msgs received on a port that is not in the correct state. ■ Type11: The number of crosslink uplink hello msgs received on a non crosslink port. ■ Type12: The number of discarded crosslink uplink hello msgs ignored on a port that is not in the correct state. ■ Type13: The number of messages with an incorrect name for this AMF network. ■ Type14: The number of over-long packets received on a port. ■ Type15: The number of messages with a bad protocol version received on a port. ■ Type16: The number of messages with a bad packet checksum calculation received on a port. ■ Type17: The number of messages with a bad authentication type received on a port. ■ Type18: The number of messages with a bad simple password received on a port. ■ Type19: The number of discarded packets with an unsupported authentication type received on a port. ■ Type20: The number of discarded packets with an unknown neighbor received on a port.

Related Commands **no debug all**
clear atmf links statistics
show atmf

show atmf memory

This command displays a summary of the AMF memory usage. It can only be run on amf master nodes.

Syntax show atmf memory

Mode User Exec

Example To display AMF memory allocations on Node_1, use the command:

```
node_1# show atmf memory
```

Figure 18: Sample output from the show atmf memory command

```
node_1#show atmf memory

ATMF Memory Allocation:

Total memory allocated : 30020 (bytes)
Total memory allocations : 77
Line 1238 number 1 memory 28 (bytes)
Line 244 number 2 memory 88 (bytes)
Line 3753 number 2 memory 1872 (bytes)
Line 1616 number 8 memory 320 (bytes)
Line 1391 number 1 memory 60 (bytes)
Line 1837 number 15 memory 600 (bytes)
Line 288 number 1 memory 17716 (bytes)
Line 3916 number 1 memory 1520 (bytes)
Line 1623 number 8 memory 320 (bytes)
Line 4477 number 1 memory 1520 (bytes)
Line 659 number 2 memory 512 (bytes)
Line 1844 number 6 memory 600 (bytes)
Line 1749 number 1 memory 32 (bytes)
Line 203 number 6 memory 600 (bytes)
Line 4205 number 1 memory 1520 (bytes)
Line 206 number 4 memory 1524 (bytes)
Line 549 number 1 memory 232 (bytes)
Line 3495 number 1 memory 56 (bytes)
Line 2628 number 2 memory 72 (bytes)
Line 678 number 1 memory 32 (bytes)
Line 1423 number 1 memory 48 (bytes)
Line 1733 number 3 memory 492 (bytes)
Line 1611 number 8 memory 256 (bytes)
```

Figure 18: Sample output from the show atmf memory command (cont.)

```

ATMF Memory Deallocation:

Total memory deallocated      : 4958 (bytes)
Total memory deallocations    : 45
Line   1395   number          4   memory          400 (bytes)
Line   1956   number          1   memory          164 (bytes)
Line   1247   number          1   memory           52 (bytes)
Line    876   number          2   memory           80 (bytes)
Line    166   number          1   memory          232 (bytes)
Line    415   number          7   memory          587 (bytes)
Line    418   number          3   memory          300 (bytes)
Line    822   number          2   memory           80 (bytes)
Line   2341   number          4   memory          160 (bytes)
Line   3025   number          2   memory           88 (bytes)
Line    144   number          3   memory         1596 (bytes)
Line    146   number          6   memory          312 (bytes)
Line   2349   number          4   memory          160 (bytes)
Line   1111   number          1   memory           59 (bytes)
Line   1393   number          4   memory          688 (bytes)

-----
Total memory in use           : 4958 (bytes)
Total memory items            : 45

```

show atmf nodes

This command displays all nodes currently configured within the AMF network. It displays a topographical representation of the network infrastructure.

This command displays a summary of all virtual links currently in the running configuration.

Syntax `show atmf nodes`

Mode Privileged Exec

Example To display AMF information for all nodes in the AMF, use the command:

```
node_1# show atmf nodes
```

Figure 19: Sample output from the show atmf nodes command.

```
node1#show atmf nodes

Node Information:

  * = Local device

SC = Switch Configuration:
  C = Chassis   S = Stackable   N = Standalone
```

Node Name	Device Type	ATMF Master	SC	Parent	Node Depth
Building_1	AT-SBx8112	Y	C	-	0
* Building_2	x900-12XT/S	Y	N	-	0
Bld1_Floor_1	SwitchBlade x908	N	S	Building_1	1
Bld1_Floor_2	x600-24Ts/XP	N	N	Building_1	1
Bld2_Floor_1	x610-24Ts-POE+	N	N	Building_1	1
SW_Team1	x210-24GT	N	N	Bld1_Floor_2	2

```
Current ATMF node count 8
```


show atmf provision nodes

This command displays information about each provisioned node with details about date and time of creation, boot and configuration files available in the backup, and license files present in the provisioned backup. This includes nodes that have joined the network but are yet to run their first backup.

This command can only be run on amf master nodes.

Syntax show atmf provision nodes

Mode Privileged Exec

Usage This command is only available on master nodes in the AMF network. The command will only work if provisioned nodes have already been set up. Otherwise, an error message is shown when the command is run.

Example To show the details of all the provisioned nodes in the backup use the command:

```
NodeName# show atmf provision nodes
```

Figure 20: Sample output from the show atmf provision nodes command

```
switch1#show atmf provision nodes
ATMF Provisioned Node Information:
Backup Media .....: SD (Total 3827.0MB, Free 3481.1MB)
Node Name           : switch2
Date & Time         : 06-May-2014 & 23:25:44
Provision Path      : card:/atmf/provision_nodes

Boot configuration :
Current boot image  : x510-1766_atmf_backup.rel (file exists)
Backup boot image   : x510-main-20140113-2.rel (file exists)
Default boot config : flash:/default.cfg (file exists)
Current boot config : flash:/abc.cfg (file exists)
Backup boot config  : flash:/xyz.cfg (file exists)

Software Licenses :
Repository file    : ../configs/.sw_v2.lic
Certificate file    : card:/atmf/nodes/awplus1/flash/.atmf-lic-cert
```

Related commands

- atmf provision node create
- atmf provision node clone
- atmf provision node configure boot config
- atmf provision node configure boot system
- show atmf backup

show atmf tech

This command collects and displays all the AMF command output. The command can thus be used to display a complete picture of an AMF network.

Syntax show atmf tech

Mode Privileged Exec

Example To display output for all AMF commands, use the command:

```
NodeName# show atmf tech
```

Figure 21: Sample output from the show atmf tech command.

```
node1#show atmf tech
ATMF Summary Information:

ATMF Status           : Enabled
Network Name          : ATMF_NET
Node Name              : node1
Role                   : Master
Current ATMF Nodes    : 8

ATMF Technical information:

Network Name           : ATMF_NET
Domain                 : node1's domain
Node Depth             : 0
Domain Flags           : 0
Authentication Type    : 0
MAC Address            : 0014.2299.137d
Board ID               : 287
Domain State           : DomainController
Domain Controller      : node1
Backup Domain Controller : node2
Domain controller MAC   : 0014.2299.137d
Parent Domain          : -
Parent Domain Controller : -
Parent Domain Controller MAC : 0000.0000.0000
Number of Domain Events : 0
Crosslink Ports Blocking : 0
Uplink Ports Waiting on Sync : 0
Crosslink Sequence Number : 7
Domains Sequence Number : 28
Uplink Sequence Number : 2
Number of Crosslink Ports : 1
Number of Domain Nodes : 2
Number of Neighbors : 5
Number of Non Broadcast Neighbors : 3
Number of Link State Entries : 1
Number of Up Uplinks : 0
Number of Up Uplinks on This Node : 0
DBE Checksum           : 84fc6
Number of DBE Entries : 0
Management Domain Ifindex : 4391
Management Domain VLAN : 4091
Management ifindex : 4392
Management VLAN : 4092
...
...
```

Table 9: Parameter definitions from the show atmf tech command

Parameter	Definition
ATMF Status	Shows status of AMF feature on the Node as Enabled/Disabled.
Network Name	The name of the AMF network to which this node belongs.
Node Name	The name assigned to the node within the AMF network.
Role	The role configured on the switch within the AMF - either master or member.
Current ATMF Nodes	A count of the AMF nodes in the AMF network.
Node Address	The identity of a node (in the format name.atmf) that enables its access it from a remote location.
Node ID	A unique identifier assigned to an AMF node.
Node Depth	The number of nodes in path from this node to the core domain.
Domain State	A node's state within an AMF Domain - either controller or backup.
Recovery State	The AMF node recovery status. Indicates whether a node recovery is in progress on this device - either Auto, Manual, or None.
Management VLAN	The VLAN created for traffic between nodes of different domains (up/down links). VLAN ID - In this example VLAN 4092 is configured as the Management VLAN. Management Subnet - the Network prefix for the subnet. Management IP Address - the IP address allocated for this traffic. Management Mask - the Netmask used to create a subnet for this traffic 255.255.128.0 (= prefix /17)
Domain VLAN	The VLAN assigned for traffic between Nodes of same domain (crosslink). VLAN ID - In this example VLAN 4091 is configured as the domain VLAN. Domain Subnet - the Subnet address used for this traffic. Domain IP Address - the IP address allocated for this traffic. Domain Mask - the Netmask used to create a subnet for this traffic 255.255.128.0 (= prefix /17)
Device Type	Shows the Product Series Name.
ATMF Master	Indicates the nodes membership of the core domain (membership is indicated by Y)
SC	Shows switch configuration: ■ C - Chassis (such as SBx8100 series) ■ S - Stackable (VCS) ■ N - Standalone
Parent	A node to which connects to the present node's uplink, i.e. one layer higher in the hierarchy.
Node Depth	Shows the number of nodes in path from the current node to the Core domain.

Note


The show atmf tech command can produce very large output. For this reason only the most significant terms are defined in this table.

show atmf working-set

This command displays the nodes that form the current AMF working-set.

Syntax show atmf working-set

Mode Privileged Exec

Example To show current members of the working-set, use the command:

```
ATMF_NETWORK[6]# show atmf working-set
```

Figure 22: Sample output from the show atmf working-set command.

```
ATMF Working Set Nodes:
node1, node2, node3, node4, node5, node6
Working set contains 6 nodes
```

Related Commands

- atmf working-set
- show atmf
- show atmf group

show debugging atmf

This command shows the debugging modes status for AMF.

Syntax `show debugging atmf`

Mode User Exec and Global Configuration

Example To display the AMF debugging status, use the command:

```
node_1# show debugging atmf
```

Figure 23: Sample output from the show debugging atmf command.

```
node1# show debugging atmf
ATMF debugging status:
ATMF link debugging is on
ATMF crosslink debugging is on
ATMF database debugging is on
ATMF neighbor debugging is on
ATMF packet debugging is on
ATMF error debugging is on
```

Related Commands [debug atmf packet](#)

show debugging atmf packet

This command shows details of AMF Packet debug command.

Syntax show debugging atmf packet

Mode User Exec and Global Configuration

Example To display the AMF packet debugging status, use the command:

```
node_1# show debug atmf packet
```

Figure 24: Sample output from the show debugging atmf packet command.

```
ATMF packet debugging is on
=== ATMF Packet Debugging Parameters===
Node Name: x900
Port name: port1.0.1
Limit: 500 packets
Direction: TX
Info Level: Level 2
Packet Type Bitmap:
2. Crosslink Hello BPDU pkt with downlink domain info
3. Crosslink Hello BPDU pkt with uplink info
4. Down and up link Hello BPDU pkts
6. Stack hello unicast pkts
8. DBE request
9. DBE update
10. DBE bitmap update
```

Related Commands [debug atmf](#)
[debug atmf packet](#)

show running-config atmf

This command displays the running system information that is specific to AMF.

Syntax `show running-config atmf`

Mode User Exec and Global Configuration

Example To display the current configuration of AMF, use the following commands:

```
node_1# show running-config atmf
```

Related Commands [show running-config](#)

switchport atmf-crosslink

This command configures the selected port or (statically) aggregated link to be an AMF crosslink. Running this command will automatically place the port or static aggregator into trunk mode (i.e. switchport mode trunk).

The connection between two AMF masters must utilize a crosslink. Crosslinks are used to carry the AMF control information between master nodes. Multiple crosslinks can be configured between two master nodes, but only one crosslink can be active at any particular time. All other crosslinks between masters will be placed in the blocking state, in order to prevent broadcast storms.

Use the **no** variant of this command to remove any crosslink that may exist for the selected port or aggregated link.

Syntax switchport atmf-crosslink
 no switchport atmf-crosslink

Mode Interface Configuration

Usage Crosslinks can be used anywhere within an AMF network. They have the effect of separating the AMF network into separate domains.

Where this command is used, it is also good practice to use the **switchport trunk native vlan** command with its parameter "**none**" selected. This is to prevent a network storm on a topology of ring connected switches.

Example 1 To make a switchport 1.0.1 an AMF crosslink, use the following commands:

```
Node_1# configure terminal
Node_1(config)# interface port1.1.1
Node_1(config-if)# switchport atmf-crosslink
```

Example 2 This example is shown twice. Example 2A is the most basic command sequence. Example 2B is a good practice equivalent that avoids problems such as broadcast storms that can otherwise occur.

Example 2A To make static aggregator sa1 an AMF crosslink, use the following commands:

```
Node_1# configure terminal
Node_1(config)# interface sa1
Node_1(config-if)# switchport atmf-crosslink
```


Example 2B To make static aggregator sa1 an AMF crosslink, use the following commands for good practice:

```
Node_1# configure terminal
Node_1(config)# interface sa1
Node_1(config-if)# switchport atmf-crosslink
Node_1(config-if)# switchport trunk allowed vlan add 2
Node_1(config-if)# switchport trunk native vlan none
```

In this example VLAN 2 is assigned to the static aggregator, and the native VLAN (VLAN 1) is explicitly excluded from the aggregated ports and the crosslink assigned to it.

Note The AMF management and domain VLANs are automatically added to the aggregator and the crosslink.



Related Commands [show atmf links statistics](#)

switchport atmf-link

This command enables you to configure a port or aggregator to be an AMF uplink/downlink. Running this command will automatically place the port or aggregator into trunk mode.

Use the **no** variant of this command to remove any AMF-link that may exist for the selected port or aggregated link.

Syntax `switchport atmf-link`
 `no switchport atmf-link`

Mode Interface Configuration

Example To make a switchport 1.0.1 an AMF crosslink, use the following commands

```
Node_1# configure terminal
Node_1(config)# interface port1.2.1
Node_1(config-if)# switchport atmf-link
```

type atmf node

This command configures a trigger to be activated at an AMF node join event or leave event.

Syntax type atmf node {join|leave}

Parameter	Description
join	AMF node join event.
leave	AMF node leave event.

Mode Trigger Configuration

Example 1 To configure trigger 5 to activate at an AMF node leave event, use the following commands. In this example the command is entered on node-1:

```
node1(config)# trigger 5
node1(config-trigger) type atmf node leave
```

Example 2 The following commands will configure trigger 5 to activate if an AMF node join event occurs on any node within the working set:

```
node1# atmf working-set group all
```

This command returns the following display:

```
=====
node1, node2, node3:
=====

Working set join
```

Note that the running the above command changes the prompt from the name of the local node, to the name of the AMF-Network followed, in square brackets, by the number of member nodes in the working set.

```
AMF-Net[3]# conf t
AMF-Net[3](config)# trigger 5
AMF-Net[3](config-trigger)# type atmf node leave
AMF-Net[3](config-trigger)# description "E-mail on AMF Exit"
AMF-Net[3](config-trigger)# active
```

Enter the name of the script to run at the trigger event.

```
AMF-Net[3](config-trigger)# script 1 email_me.scp
AMF-Net[3](config-trigger)# end
```

Display the trigger configurations

```
AMF-Net[3]# show trigger
```

This command returns the following display:

```
=====
node1:
=====

TR# Type & Details      Description      Ac Te Tr Repeat      #Scr Days/Date
-----
001 Periodic (2 min)    Periodic Status Chk Y  N  Y Continuous    1  smtwtf
005 ATMF node (leave)   E-mail on ATMF Exit Y  N  Y Continuous    1  smtwtf
-----

=====
Node2, Node3,
=====

TR# Type & Details      Description      Ac Te Tr Repeat      #Scr Days/Date
-----
005 ATMF node (leave)   E-mail on ATMF Exit Y  N  Y Continuous    1  smtwtf
-----
```

Display the triggers configured on each of the nodes in the AMF Network.

```
AMF-Net[3]# show running-config trigger
```

This command returns the following display:

```
=====
Node1:
=====

trigger 1
  type periodic 2
  script 1 atmf.scp
trigger 5
  type atmf node leave
  description "E-mail on ATMF Exit"
  script 1 email_me.scp
!

=====
Node2, Node3:
=====

trigger 5
  type atmf node leave
  description "E-mail on ATMF Exit"
  script 1 email_me.scp
!
```

undebbug atm

This command is an alias for the **no** variant of the [debug atm](#) command on page 212.

The IPv4 addresses shown may include those specified for documentation purposes in RFC 5737: 192.0.2.0/24, 198.51.100.0/24, 203.0.113.0/24. These addresses should not be used for practical networks (other than for testing purposes), nor should they appear in any public network.

AlliedWare Plus Version 5.4.4-0.1

For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, and x210 Series Switches

Contents

Introduction	258
New Products	260
x210 Series Enterprise Edge Switches	260
x510-GPX Series Stackable Gigabit Switches with PoE+	260
x510-28GSX Stackable Fiber Gigabit Switch	261
x510DP-52GTX Stackable Gigabit Switch for Datacenters	261
IX5-28GPX High Availability Video Surveillance PoE+ Switch	262
XEM-24T for x900 Series and SBx908 Switches	262
SwitchBlade x8106 Advanced Layer 3+ Chassis Switch	262
SBx81CFC960 control card for SBx8100 Series	263
SBx81GT40 line card for SBx8100 Series	263
Key New Features and Enhancements	265
Allied Telesis Management Framework	265
VCStack Plus for SBx8100 Series with CFC960 Control Cards	265
VRF-Lite	265
BGP4+	266
IPv6 Hardware ACLs	266
Authentication Enhancements	266
Port Flapping Detection	266
Release Licensing	266
Important Considerations Before Upgrading to this Version	267
Licensing	267
Upgrading a VCStack	267
Forming or extending a VCStack	267
AMF software version compatibility	268
Upgrading all switches in an AMF network	268
Changes in this Version	269
Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch	289
Licensing this Software Version on a Control Card on an SBx8100 Series Switch	291
Installing this Software Version	293
Installing the GUI	295

Introduction

This release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4 since version 5.4.3-0.1. For more information, see the Software Reference for your switch. Software file details for this version are listed in [Table 1-1](#) below.



Caution: Software version 5.4.4 requires a release license. Ensure that you load your license certificate onto each switch before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- “Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 289 and
- “Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 291.

Table 1-1: Switch models and software file names

Models	Series	Software File	GUI File	Date
x210-9GT x210-16GT x210-24GT	x210	x210-5.4.4-0.1.rel	x210-gui_544_06.jar	03/ 2014
IX5-28GPX	IX5	IX5-5.4.4-0.1.rel	x510-gui_544_07.jar	03/ 2014
x510-28GTX x510-52GTX x510-28GPX x510-52GPX x510-28GSX x510DP-52GTX	x510	x510-5.4.4-0.1.rel	x510-gui_544_07.jar	03/ 2014
x610-24Ts x610-24Ts-PoE+ x610-24Ts/X x610-24Ts/X-PoE+ x610-24SPs/X x610-48Ts x610-48Ts-PoE+ x610-48Ts/X x610-48Ts/X-PoE+	x610	x610-5.4.4-0.1.rel	x610-gui_544_07.jar	03/ 2014
x900-12XT/S x900-24XS x900-24XT	x900	x900-5.4.4-0.1.rel	x900-gui_544_07.jar	03/ 2014
SwitchBlade x908	SBx908	SBx908-5.4.4-0.1.rel	x900-gui_544_07.jar	03/ 2014
SwitchBlade x8106 SwitchBlade x8112	SBx8100	SBx81CFC400-5.4.4-0.1.rel or SBx81CFC960-5.4.4-0.1.rel	SBx81CFC400_gui_544_07.jar n/a	03/ 2014

Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.

New Products

AlliedWare Plus version 5.4.4 supports the following products that are new since 5.4.3-0.1.

x210 Series Enterprise Edge Switches

The x210 Series is a reliable and value-packed solution for today's networks. With a choice of 9-port, 16-port and 24-port versions, each with one or more SFP uplinks, the x210 Series switches are ideal for applications at the edge of the network where security and manageability are the key requirements.



Table 1: x210 Series models and port specifications

Product	10/100/1000T (RJ-45) Copper Ports	SFP and 10/100/1000T Combo Ports	100/1000X SFP Ports
x210-9GT	8	–	1
x210-16GT	14	2	–
x210-24GT	20	4	–

For more information on the x210 Series switches, see the *x210 Series Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/x210.

x510-GPX Series Stackable Gigabit Switches with PoE+

x510 GPX Series switches deliver the full 30 Watts of PoE+, making them great for high power devices in enterprises, retail, government, universities and medical campuses.



The two switches in the series feature 24 or 48 x 10/100/1000T PoE ports and 4 x 10G/1G SFP+ uplink ports. They include two internal power supplies for high reliability, as well as VCSStack™, allowing devices to be stacked to create highly resilient solutions that can be distributed over long distances. They deliver up to 30 Watts per port (PoE+), perfect for supporting standard as well as Pan/Tilt/Zoom video surveillance and security cameras, wireless access points, IP phones, RFID readers, automatic doors and other PoE-powered devices. This PoE option eliminates the need for power rewiring and minimizes the clutter of power supplies and adapters in awkward places.

Table 2: x510-GPX Series models and port specifications

Product	10/100/1000T (RJ-45) Copper Ports	1/10Gigabit SFP+ Ports	10 Gigabit Stacking Ports	Max PoE+ Ports
x510-28GPX	24	4 (2 if stacked)*	2*	24
x510-52GPX	48	4 (2 if stacked)*	2*	48

*Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the x510 GPX Series switches, see the *x510 Series Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/x510.

x510-28GSX Stackable Fiber Gigabit Switch

The AT-x510-28GSX provides an advanced feature set for fiber networks, with 24 x 100/1000X fiber access ports and 4 x 1G/10G SFP+ uplink ports. Two internal power supplies provide high reliability, and the power of VCStack™ allows multiple units to create a single virtual device for a highly resilient solution that can be distributed over long distances. The AT-x510-28GSX is ideal for Network Service Providers, supporting fiber access solutions for FTTB (Fiber To The Building) or FTTH (Fiber To The Home), and is equally well-suited to enterprise customers who require total data security, or industrial applications, where the noise immunity of fiber connectivity provides a reliable network infrastructure.



Table 3: x510-28GSX port specifications

Product	100/1000X SFP Ports	1/10Gigabit SFP+ Ports	10 Gigabit Stacking Ports
x510-28GSX	24	4 (2 if stacked)*	2*

*Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the x510-28GSX switch, see the *x510 Series Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/x510.

x510DP-52GTX Stackable Gigabit Switch for Datacenters

The AT-x510DP-52GTX is the ideal Datacenter Top-of-Rack (ToR) switch, featuring 48 x 10/100/1000T ports and 4 x 10G SFP+ uplink ports for high speed server and storage connectivity. Dual hot-swappable load-sharing AC or DC power supplies with optional reverse airflow guarantee maximum uptime. Allied Telesis VCStack allows multiple units to be connected as a single virtual chassis, creating a highly resilient solution with no single point of failure that can even be distributed over long distances. The AT-x510DP-52GTX is the perfect choice for critical Datacenter applications requiring uninterrupted service.



Table 4: x510DP-52GTX port specifications

Product	10/100/1000T (RJ-45) Copper Ports	1/10Gigabit SFP+ Ports	10 Gigabit Stacking Ports
x510DP-52GTX	48	4 (2 if stacked)*	2*

*Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the x510DP-52GTX switch, see the *x510 Series Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/x510dp-52gtx.

IX5-28GPX High Availability Video Surveillance PoE+ Switch

The IX5-28GPX provides a high performing and scalable solution for today's networks. With 24 PoE+ enabled 10/100/1000Mbps ports, four 1/10 Gigabit uplinks, plus the ability to stack up to four units, the AT-IX5-28GPX is the ideal solution for video surveillance applications where high performance and resilient PoE power are critical.



Table 5: IX5 port specifications

Product	10/100/1000T (RJ-45) Copper Ports	1/10Gigabit SFP+ Ports	10 Gigabit Stacking Ports	Max PoE+ Ports
IX5-28GPX	24	4 (2 if stacked)*	2*	24

* Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the IX5-28GPX switch, see the *IX5 Data Sheet*, *Installation Guide* and *Software Reference*. These documents are available from our website at alliedtelesis.com/switches/ix5-28gpx.

XEM-24T for x900 Series and SBx908 Switches

The XEM-24T expansion module provides 24 x 10/100/1000T copper ports, utilizing the latest RJ point five connectors to double the port density previously available.



SwitchBlade x8106 Advanced Layer 3+ Chassis Switch

The SwitchBlade® x8106 features 80Gbps non-blocking throughput to each line card slot, providing maximum performance and wirespeed delivery of critical IPv4 and IPv6 traffic. This compact, 4RU advanced Layer 3+ chassis switch features 6 slots and an included fan module.



The SwitchBlade x8106 is a compact, high-performing, scalable solution providing an extensive range of connectivity options. Dual control cards are partnered with four line cards, or a single control card can be used with five line cards. Gigabit and 10 Gigabit line card options ensure a system capable of meeting the requirements of today's networks, and the flexibility to expand when required.

For more information on the SBx8106 switch, see the *SBx8100 Data Sheet, Installation Guide and Software Reference*. These documents are available from our website at alliedtelesis.com/switches/sbx8100.

SBx81CFC960 control card for SBx8100 Series

With SBx81CFC960 control cards, the SwitchBlade x8100 Series support advanced features and high-availability for a superior network core solution. Dual CFC960 control cards provide up to 160Gbps non-blocking throughput to each line card slot, for maximum performance. The CFC960 control card supports four 10G fiber SFP+ modules.



Two CFC960 based chassis can be stacked together into a single virtual unit using VCSStack Plus™. This creates a powerful and completely resilient network core, which can even be distributed over long distance. Other powerful features such as VRF-Lite ensure a network solution that is scalable and ready to meet the demands of the large enterprise business.

Key new features in 5.4.4 for SBx8100 Series switches with CFC960 control cards

- Allied Telesis Management Framework (AMF) for simple management of your whole network. The CFC960 supports larger networks of up to 120 nodes.¹
- VCSStack Plus to stack two chassis into a distributed virtual chassis with no single point of failure
- VRF-Lite
- BGP4+ for IPv6²

For information about the AlliedWare Plus features on the CFC960, see the *AlliedWare Plus Software Reference for SwitchBlade x8100 Series Switches*. For more information about the hardware, see the *Installation Guides*.

These documents are available from our website at alliedtelesis.com/switches/sbx8100.

SBx81GT40 line card for SBx8100 Series

The SBx81GT40 line card provides 40 Gigabit copper ports for maximum port density, using RJ point five connectors. Up to 400 ports can be deployed in a single SwitchBlade x8112 7RU chassis, allowing for the aggregation of densely populated networking devices.



1. The CFC400 supports networks of up to 80 AMF nodes
2. BGP4+ is also available on the CFC400

For more information about the SBx81GT40, see our website at alliedtelesis.com/switches/sbx8100.

Key New Features and Enhancements

Software version 5.4.4 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.3-0.1. This includes all features that were released in 5.4.3 minor releases.

This section summarizes the key new features. For a list of all new and enhanced features and commands, see [“Changes in this Version” on page 269](#). For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Allied Telesis Management Framework

Allied Telesis Management Framework (AMF) is a sophisticated suite of management tools that provides a simplified approach to network management. Common tasks are automated or made so simple that the day-to-day running of a network can be achieved without the need for highly trained, and expensive, network engineers. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.

Since its initial release in software version 5.4.3-1.4, AMF has been enhanced with features to increase its versatility, including the ability to work over WAN links and support for larger networks—up to 120 nodes.

VCStack Plus for SBx8100 Series with CFC960 Control Cards

VCStack Plus makes networking simple. It allows a pair of physically separate chassis switches to be connected together via high speed stacking links. This aggregates the switches, which then appear as a single switch, or ‘virtual chassis’.

The virtual chassis can be configured and managed via a single serial console or IP address, which provides greater ease of management in comparison to an arrangement of individually managed switches, and often eliminates the need to configure protocols like VRRP and Spanning Tree. It is a powerful and completely resilient network core, which can be distributed over a long distance.

VRF-Lite

VRF-Lite provides Layer 3 network virtualization by dividing a single router into multiple independent virtual routing domains. With independent routing domains, IP addresses can overlap without causing conflict, allowing multiple customers to have their own secure virtual network within the same physical infrastructure.

VRF-Lite is now available on SBx8112 and SBx8106 Chassis switches with CFC960 control cards, as well as SBx908, x900 Series, and x610 Series switches.

DHCP Relay and DNS Relay are also now VRF-Lite aware.

BGP4+

Border Gateway Protocol (BGP) for IPv6 is an exterior gateway protocol, often used between gateway hosts on the Internet. It enables gateways to exchange routing information and so to advertise, learn, and choose the best paths inside the Internet.

Software version 5.4.4 supports BGP4+ for IPv6, as well as BGP for IPv4. BGP4+ is supported on x610 Series, x900 Series, SwitchBlade x908, and SwitchBlade x8100 Series switches.

IPv6 Hardware ACLs

IPv6 hardware access-lists enable you to control the transmission of IPv6 packets on an interface, and to restrict the content of routing updates.

IPv6 hardware ACLs are now available on IX5-28GPX, x510 Series, and x610 Series switches, as well as SwitchBlade x908 and SwitchBlade x8100 Series switches.

Authentication Enhancements

Authentication now includes the following enhancements:

- Web Authorization Proxy—enables Web Authentication to apply the supplicant's Web Proxy settings.
- Two-step Authorization—improves security by authenticating both the device and the user.

Port Flapping Detection

Port flapping detection will disable any ports that flap more than 15 times in less than 15 seconds. This limits the impact of an unreliable link.

Release Licensing

From software version 5.4.4 onwards, AlliedWare Plus software releases are licensed. Before upgrading your software, please obtain a license from your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license. For details, see:

- [“Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 289](#) and
- [“Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 291](#).

Important Considerations Before Upgrading to this Version

Licensing

For software version 5.4.4-0.1 to 5.4.4-0.3, AlliedWare Plus software releases require a license on all products. From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases require a license on SBx8100 and SBx908 Series switches only.

Before upgrading your software, please obtain a license from your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:

- [“Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 289 and](#)
- [“Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 291.](#)

Upgrading a VCStack

This version supports VCStack “reboot rolling” upgrades. With the **reboot rolling** command, you can reduce downtime when upgrading a VCStack.

You can use the **reboot rolling** command to upgrade to any 5.4.4-0.x version from any 5.4.3-x.x version.

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

Auto-synchronization is supported between all versions of 5.4.4-0.x. It is not supported between 5.4.4-0.x and earlier versions, such as 5.4.3-x.x.

Before you add a new switch to a stack, make sure the new switch’s software version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.

AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with switches running version 5.4.3-2.6 and later, or any 5.4.4-0.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

You can use these methods to upgrade to this version from 5.4.3-2.6 and later.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).
2. Decide which AMF upgrade method is most suitable.
3. Initiate the AMF network upgrade using the selected method. To do this:
 - a. create a working-set of the switches you want to upgrade
 - b. enter the command **atmf reboot-rolling <location>** or **atmf distribute-firmware <location>** where **<location>** is the location of the .rel files.
 - c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.

Changes in this Version

Table 6 below lists new and modified features in this version.

Table 7 on page 274 below lists all new and modified commands in this version and shows which chapter of the Software References has details of each command.

Table 8 on page 288 below lists new and modified SNMP (Simple Network Management Protocol) MIBs (Management Information Bases) in this version.

Note In the following tables the product columns contain the pre-release indicators P and P¹:



P indicates that the change was introduced prior to software release 5.4.3.

P¹ indicates that the change was introduced in a 5.4.3 maintenance release such as 5.4.3-1.4.

Table 6: New and modified features in 5.4.4

Feature	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
Allied Telesis Management Framework	New	Y	p ¹	p ¹	p ¹	p ¹	p ¹	p ¹	AMF Introduction and Configuration	The Allied Telesis Management Framework (AMF) is a suite of features that combine to simplify network management across all supported network switches from the core to the edge.
BGP4+	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Introduction	Software version 5.4.4 supports the routing protocol BGP4+ for IPv6, as well as BGP for IPv4. BGP4+ is described in RFC 2283 (Multiprotocol Extensions for BGP-4).

Table 6: New and modified features in 5.4.4(cont.)

Feature	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
DHCP Operation With VRF Lite	Modified	N	N	N	p ¹	p ¹	p ¹	Y	Internet Protocol (IP) Addressing and Protocols	You can now configure DHCP Relay to forward packets within a VRF Lite instance. DHCP messages between DHCP Clients and a DHCP Server are then able to be relayed between VLAN interfaces within a VRF Lite instance.
DNS Operation With VRF Lite	Modified	N	N	N	p ¹	p ¹	p ¹	Y	Internet Protocol (IP) Addressing and Protocols	When running VRF Lite, you can now configure DNS Relay functionality to be VRF aware. In this mode DNS Relay messages can be forwarded within specified VRF instances. VRF aware DNS services to remotely connected DNS clients is also supported. These VRF aware services include: ping, traceroute, telnet client, SSH client, and tcpdump.
IPv6 Hardware ACLs	New	N	Y	Y	Y	p ¹	p ¹	p ¹	Access Control Lists Introduction	IPv6 hardware access-lists enable you to control the transmission of IPv6 packets on an interface, and to restrict the content of routing updates. IPv6 hardware ACLs are now available on your switch.
Release Licenses	New	Y	Y	Y	Y	Y	Y	Y	Licensing Introduction and Configuration	From software version 5.4.4 onwards, AlliedWare Plus software releases are licensed. If you want to upgrade your software, please obtain a license from your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.
Secure USB	New	N	p ¹	p ¹	N	N	N	p ¹	Creating and Managing Files	Support for secure USB storage devices has been added.
TACACS+	New	p ¹	p ¹	P	P	P	P	P	TACACS+ Introduction and Configuration	Software version 5.4.4 supports TACACS+ on x210 Series switches. TACACS+ provides a method for securely managing multiple network access points from a single management service. It allows a device to forward a user's username and password to an authentication server to determine whether access can be allowed. In addition to this authentication service, TACACS+ can also provide authorization and accounting services.

Table 6: New and modified features in 5.4.4(cont.)

Feature	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
Two-step Authentication	New	Y	Y	p1	p1	Y	Y	Y	Authentication Introduction and Configuration	Support for Two-step Authentication has been added. Two-step Authentication improves security by requiring two forms of authentication.
VCStack Plus	New	N	N	N	N	N	N	Y	VCStack Plus Introduction	VCStack Plus is a pair of physically separate switches that are configured to operate as a single switch. Two chassis can be stacked together into a single virtual unit creating a powerful and completely resilient network core, which can be distributed over a long distance.
VRF Lite	New	N	N	N	p1	p1	p1	Y	VRF-Lite Introduction and Configuration	The Virtual Routing and Forwarding Lite (VRF-Lite) feature is now available on your switch.
Web Authorization Proxy	New	Y	Y	p1	p1	Y	Y	Y	Authentication Introduction and Configuration	Support for Web Authorization Proxy has been added.

If your existing configurations include commands modified or deprecated in this version (see the Status column), check whether you need to modify these configurations. For full command descriptions, modes and examples, see the appropriate Software Reference for your switch.

Table 7: New and modified commands in 5.4.4

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show dot1x	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	802.1X Commands	This command displays authentication information for 802.1X port authentication. It now includes output for the new commands auth connect-timeout period and auth two-step enable .
show dot1x interface	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	802.1X Commands	This command displays authentication information for 802.1X port authentication. It now includes output for the new commands auth two-step enable and auth connect-timeout period .
show dot1x supplicant	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	802.1X Commands	This command displays the supplicant state of the authentication mode set for the switch. It now displays Two-step Authentication states.
show dot1x supplicant interface	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	802.1X Commands	This command displays the supplicant state of the authentication mode set for the switch. It now displays Two-step Authentication states.
atmf backup bandwidth	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command sets the maximum bandwidth when initiating an AMF backup.
atmf distribute firmware	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command can be used to upgrade software one AMF node at a time. A URL can be selected from any media location. The latest compatible release for a node will be selected from this location.
atmf log-verbose	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command limits the number of log messages displayed on the console or permanently logged.
atmf virtual-link id ip remote-id remote-ip	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command creates one or more layer two tunnels that enable AMF nodes to transparently communicate across a wide area network using only layer two protocols.
show atmf detail	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command displays details about an AMF node.
show atmf diagnostics	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command displays diagnostic information for an entire AMF network.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show atmf links	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command displays details about an AMF node.
show atmf links statistics	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	In addition to its original function, this command is now also able to display the AMF link configuration and packet exchange statistics for a specified interface.
show atmf memory	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command displays a summary of the AMF memory usage.
show atmf nodes	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command displays all nodes currently configured within the AMF network by showing a topographical representation of the network infrastructure.
show atmf tech	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This new command collects and displays all the AMF command output.
show debugging atmf	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This command shows the debugging modes status for AMF.
show debugging atmf packet	New	Y	Y	p ¹	Y	p ¹	p ¹	p ¹	AMF Commands	This command shows details of AMF Packet debug command.
auth supplicant-mac	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command has a new parameter skip-second-auth that enables the second authorization to be skipped.
auth timeout connect-timeout	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command sets the connect-timeout period for the interface.
auth two-step enable	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command enables the two-step authentication feature on the interface.
auth-mac password	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command changes the password for MAC-based authentication. Changing the password increases the security of MAC-based authentication, because the default password is easy for an attacker to discover.
auth-web forward	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command has a new parameter called <ip-address> that enables forwarding to the specified destination IPv4 address.
auth-web-server dhcp-wpad-option	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command sets the DHCP WPAD option for the web authentication temporary DHCP service.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
auth-web-server intercept-port	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command registers any additional TCP port numbers that the web authentication server is to intercept.
copy proxy-autoconfig-file	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command downloads the proxy auto configuration (PAC) file to your switch.
erase proxy-autoconfig-file	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command removes the proxy auto configuration file.
show auth two-step supplicant brief	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command displays the supplicant state of the two-step authentication feature on the interface.
show auth-web	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command displays the authentication information for Web-based authentication. It now includes output for the new command auth two-step enable .
show auth-web-server	Modified	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command has new output showing the web authentication server configuration and status on the switch.
show proxy-autoconfig-file	New	Y	Y	p ¹	p ¹	Y	Y	Y	Authentication Commands	This command displays the contents of the proxy autoconfig (PAC) file.
address-family	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now enters the IPv6 Address Family Configuration command mode with the new ipv6 parameter, in addition to the IPv4 Address Family Configuration mode with the existing ipv4 parameter. In this mode you can configure address-family specific parameters.
aggregate-address	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command has been modified for BGP4+ to optionally use an IPv6 prefix and length to add an aggregate route that can be advertised to BGP4+ neighbors. This command creates an aggregate entry in the BGP4+ routing table if the switch learns, by any means, any routes that are within the range configured by the aggregate address/mask.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
bgp router-id	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configure the router identifier for BGP and BGP4+. Note you must specify an IPv4 address with this when used for BG4+.
clear bgp (ASN)	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	The unicast and multicast parameter options have been removed in this release.
clear bgp (IPv4 or IPv6 address)	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now enables you to reset BGP4+ connections for specified peers, as well as BGP connections. The new option has been available since version 5.4.3-2.5.
clear bgp external	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	The unicast and multicast parameter options have been removed in this release.
clear bgp ipv6 (ASN)	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command enables you to reset the BGP4+ connections to all peers in a specified Autonomous System Number (ASN).
clear bgp ipv6 (ipv6 address)	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command resets the BGP4+ connection to the peer specified by the IP address.
clear bgp ipv6 dampening	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command clears route dampening information and unsuppress routes that have been suppressed routes.
clear bgp ipv6 external	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command resets the BGP4+ connections to all external peers.
clear bgp ipv6 flap-statistics	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command clears the flap count and history duration for the specified prefixes.
clear bgp ipv6 peer-group	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command resets BGP4+ connections to all members of a peer group.
clear ip bgp (IPv4)	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the clear ip bgp command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
clear ip bgp dampening	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	The unicast and multicast parameter options have been removed in this release.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
clear ip bgp flap-statistics	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	The unicast and multicast parameter options have been removed in this release.
clear ip bgp peer-group	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	The unicast and multicast parameter options have been removed in this release.
exit-address-family	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now exits either the IPv6 or the IPv4 Address Family Configuration command mode.
neighbor activate	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now enables the exchange of BGP IPv4 and BGP4+ IPv6 routes with a BGP or BGP4+ neighboring router, and also within an IPv4 or an IPv6 specific address-family.
neighbor advertisement-interval	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now sets up the minimum interval between sending the BGP or BGP4+ routing updates.
neighbor allowas-in	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now accepts an AS-path with the specified Autonomous System (AS) number from inbound updates for both BGP and BGP4+ routes.
neighbor as-origination-interval	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now enables the sending of AS (Autonomous System) origination routing updates to the specified BGP or BGP4+ neighbor.
neighbor attribute-unchanged	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now advertises unchanged BGP or BGP4+ attributes to the specified BGP or BGP4+ neighbor.
neighbor capability graceful-restart	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configures the device to advertise the Graceful Restart Capability to BGP and BGP4+ neighbors.
neighbor capability orf prefix-list	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now advertises the OSF (Outbound Route Filters) capability to BGP and BGP4+ neighbors.
neighbor capability route-refresh	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now advertises the route-refresh capability to the specified BGP and BGP4+ neighbors.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
neighbor collide-established	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command specifies a BGP or BGP4+ neighbor, which is already in an 'established' state, for conflict resolution when a TCP connection collision is detected.
neighbor default-originate	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now allows a BGP or BGP4+ local router to send the default route, 0.0.0.0, to a neighbor.
neighbor description	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now associates a description with a BGP or a BGP4+ neighbor.
neighbor disallow-infinite-holdtime	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now disallows the configuration of infinite holdtime for BGP and BGP4+.
neighbor distribute-list	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now filters route updates from a particular BGP or BGP4+ neighbor using an Access Control List (ACL).
neighbor dont-capability-negotiate	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now disables capability negotiation for BGP and BGP4+.
neighbor ebgp-multihop	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now accepts and attempts BGP and BGP4+ connections to external peers on indirectly connected networks.
neighbor enforce-multihop	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now enforces the requirement that BGP and BGP4+ neighbors form multihop connections.
neighbor filter-list	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now creates a BGP or a BGP4+ filter using an AS (Autonomous System) path list.
neighbor interface	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now configures the interface name of a BGP and a BGP4+ speaking neighbor.
neighbor local-as	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now configures a local AS number for the specified BGP or BGP4+ neighbor.
neighbor maximum-prefix	Modified	N	N	N	p1	p1	p1	p1	BGP and BGP4+ Commands	This command now controls the number of prefixes that can be received from a BGP or a BGP4+ neighbor.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
neighbor next-hop-self	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configures the BGP or BGP4+ router as the next hop for a BGP or BGP4+ speaking neighbor or peer group.
neighbor override-capability	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now overrides a capability negotiation result for BGP and BGP4+.
neighbor passive	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configures the local BGP or BGP4+ router to be passive to the specified BGP or BGP4+ neighbor.
neighbor password	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now enables MD5 authentication on a TCP connection between BGP and BGP4+ neighbors.
neighbor peer-group (add a neighbor)	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now adds a BGP or a BGP4+ neighbor to an existing peer-group.
neighbor peer-group (create a peer-group)	Modified	N	N	N	Y	Y	Y	Y	BGP and BGP4+ Commands	This command now creates a peer-group for BGP and BGP4+.
neighbor port	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now specifies the TCP port to which packets are sent to on a BGP or a BGP4+ neighbor.
neighbor prefix-list	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now distributes BGP and BGP4+ neighbor information as specified in a prefix list.
neighbor remote-as	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configures an internal or external BGP or BGP4+ (iBGP or eBGP) peering relationship with another router.
neighbor restart-time	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configures a different restart-time from the global restart-time configured using the bgp graceful-restart command for BGP and BGP4+.
neighbor route-map	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now applies a route map to incoming or outgoing routes for BGP and BGP4+.
neighbor send-community	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now specifies that a community attribute should be sent to a BGP or BGP4+ neighbor.
neighbor shutdown	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now disables a peering relationship with a BGP or BGP4+ neighbor.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
neighbor soft-reconfiguration inbound	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now configures the switch to start storing all updates from the BGP or BGP4+ neighbor, without any consideration of any inward filtering policy that might be applied to the connection with this BGP or BGP4+ neighbor.
neighbor timers	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now sets the keepalive, holdtime, and connect timers for a specific BGP or BGP4+ neighbor.
neighbor transparent-as	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now specifies not to append your AS path number even if the BGP or BGP4+ peer is an eBGP peer.
neighbor transparent-nexthop	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now specifies to keep the nexthop value of the route if the BGP or BGP4+ peer is an eBGP peer.
neighbor unsuppress-map	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now selectively leaks more specific routes to a particular BGP or BGP4+ neighbor.
neighbor update-source	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now specifies the source IPv4 or IPv6 address of BGP or BGP4+ packets, which are sent to the neighbor for routing updates, as the IPv4 or IPv6 address configured on the specified interface.
neighbor weight	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now sets default weights for routes from this BGP or BGP4+ neighbor.
network	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now specifies particular routes to be redistributed into the BGP or BGP4+ routing process.
network synchronization	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now ensures the exact same static network prefix, specified through any of the network commands, is local or has IGP reachability before introduction to BGP or BGP4+.
show bgp ipv6	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays BGP4+ network information for a specified IPv6 address.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show bgp ipv6 community	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays routes that match specified communities within an IPv6 environment.
show bgp ipv6 community-list	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command display routes that match the given community-list within an IPv6 environment.
show bgp ipv6 dampening	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command shows dampened routes from a BGP4+ instance.
show bgp ipv6 filter-list	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays routes conforming to the filter-list within an IPv6 environment.
show bgp ipv6 inconsistent-as	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays routes with inconsistent AS Paths within an IPv6 environment.
show bgp ipv6 longer-prefixes	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays the route of the local BGP4+ routing table for a specified prefix with a specific mask, or for any prefix having a longer mask than the one specified.
show bgp ipv6 neighbors	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays detailed information on peering connections to all BGP4+ neighbors within an IPv6 environment.
show bgp ipv6 paths	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays BGP4+ path information within an IPv6 environment.
show bgp ipv6 prefix-list	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays routes matching the prefix-list within an IPv6 environment.
show bgp ipv6 quote-regexp	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays routes matching the AS path regular expression stated in quotes within an IPv6 environment.
show bgp ipv6 regexp	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays routes matching the AS path regular expression without using quotes within an IPv6 environment.
show bgp ipv6 route-map	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays BGP4+ routes that match the specified route-map within an IPv6 environment.
show bgp ipv6 summary	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command displays a summary of BGP4+ neighbor status within an IPv6 environment.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show ip bgp neighbors	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command now has separate IPv6 address and IPv4 address parameters, to support BGP on both IPv4 and IPv6. The new parameters have been available since version 5.4.3-2.5.
show ip bgp neighbors connection-retrytime	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors connection-retrytime command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors hold-time	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors hold-time command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors keepalive	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors keepalive command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors keepalive-interval	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors keepalive-interval command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors notification	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors notification command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors open	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors open command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show ip bgp neighbors rcvd-msgs	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors rcvd-msgs command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors sent-msgs	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors sent-msgs command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
show ip bgp neighbors update	Modified	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors update command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.
synchronization	New	N	N	N	p ¹	p ¹	p ¹	p ¹	BGP and BGP4+ Commands	This command enables IGP (Internal Gateway Protocol) synchronization of Internal BGP4+ (iBGP) learned routes with the IGP system in the Router Configuration mode or in the IPv6 Address Family Configuration mode.
show counter dhcp-relay	Modified	N	N	N	p ¹	p ¹	p ¹	Y	Dynamic Host Configuration Protocol (DHCP) Commands	This command shows counters for the DHCP Relay Agent on your device. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance or the global VRF Lite instance.
show ip dhcp-relay	Modified	N	N	N	p ¹	p ¹	p ¹	Y	Dynamic Host Configuration Protocol (DHCP) Commands	This command shows the configuration of the DHCP Relay Agent on each interface. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance or the global VRF Lite instance.
clear arp-cache	Modified	N	N	N	Y	Y	Y	Y	IP Addressing and Protocol Commands	This command now enables you to specify the IPv4 address for a VRF Lite instance, of an ARP entry to be cleared from the ARP cache.
clear ip dns forwarding cache	Modified	N	N	N	p ¹	p ¹	p ¹	Y	IP Addressing and Protocol Commands	This command clears the DNS Relay name resolver cache. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
ip name-server	Modified	N	N	N	p ¹	p ¹	p ¹	Y	IP Addressing and Protocol Commands	This command adds IPv4 or IPv6 DNS server addresses. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance.
show ip dns forwarding cache	Modified	N	N	N	p ¹	p ¹	p ¹	Y	IP Addressing and Protocol Commands	This command displays the DNS Relay name resolver cache. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance or the global VRF Lite instance.
show ip dns forwarding server	Modified	N	N	N	p ¹	p ¹	p ¹	Y	IP Addressing and Protocol Commands	This command has been modified to provide VRF Lite capability.
show ip name-server	Modified	N	N	N	p ¹	p ¹	p ¹	Y	IP Addressing and Protocol Commands	This command displays a list of IPv4 and IPv6 DNS server addresses that your switch will send DNS requests to. This command has been modified to provide VRF Lite capability allowing a specific VRF Lite instance, or the global VRF Lite instance.
(ipv6 access-list named ICMP filter)	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This ACL filter adds a filter entry for an IPv6 source and destination address and prefix, with ICMP (Internet Control Message Protocol) packets, to the current named IPv6 access-list.
(ipv6 access-list named protocol filter)	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This ACL filter adds a filter entry for an IPv6 source and destination address and prefix, with an IP protocol type specified, to the current named IPv6 access-list.
(ipv6 access-list named TCP UDP filter)	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This ACL filter adds a filter entry for an IPv6 source and destination address and prefix, with TCP (Transmission Control Protocol) or UDP (User Datagram Protocol) source and destination ports specified, to the current named IPv6 access-list.
commit (IPv6)	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This command commits the IPv6 ACL filter configuration entered at the console to the hardware immediately without exiting the IPv6 Hardware ACL Configuration mode.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
ipv6 access-list (named)	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This command creates a new IPv6 hardware access-list, or selects an existing IPv6 hardware access-list to add a filter to it.
ipv6 traffic-filter	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This command adds an IPv6 hardware-based access-list to an interface.
show ipv6 access-list (IPv6 Hardware ACLs)	New	N	Y	Y	Y	P	P	P	IPv6 Hardware Access Control List (ACL) Commands	This command displays all configured hardware IPv6 access-lists or the IPv6 access-list specified by name.
license	Modified	Y	Y	Y	Y	Y	Y	Y	Licensing Commands	This command enables the licensed software feature set.
license certificate	Modified	Y	Y	Y	Y	Y	Y	Y	Licensing Commands	This command enables you to apply software release licenses from a license certificate file to devices.
license member (deleted)	Deleted	N	Y	Y	Y	Y	Y	Y	Licensing Commands	This command has been deleted. Use the license command instead to apply feature licenses to stack members.
show license	Modified	Y	Y	Y	Y	Y	Y	Y	Licensing Commands	This command displays information about a specific software license, or all enabled software feature licenses on the device.
show license brief	Modified	Y	Y	Y	Y	Y	Y	Y	Licensing Commands	This command displays information about a specific software license, or all enabled software feature licenses on the device.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show license brief member	Modified	N	Y	Y	Y	Y	Y	Y	Licensing Commands	This command displays summarized information about a specific software license, or all software feature licenses enabled on either a specific stack member or all stack members.
show license member	Modified	N	Y	Y	Y	Y	Y	Y	Licensing Commands	This command displays information about a specific software license, or all software feature licenses enabled on either a specific stack member or all stack members.
show system mac license	New	Y	Y	Y	Y	Y	Y	Y	Licensing Commands	This command displays the physical MAC address available on a stack, a chassis, or a standalone device required for release licensing.
exception coredump size (deprecated)	Deprecate d	Y	Y	Y	Y	Y	Y	Y	Logging Commands	This command has been deprecated in 5.4.4 release, and will be removed in a later release. There are no alternative commands.
remote-command (deprecated)	Deprecate d	N	Y	Y	Y	Y	Y	Y	Stacking Commands	This command has been deprecated; please use the remote-login command instead.
card provision (deprecated)	Deprecate d	N	N	N	N	N	N	Y	Switching Commands	This command has been deprecated; please use the switch card provision command instead.
linkflap action	New	Y	Y	Y	Y	Y	Y	Y	Switching Commands	This command enables port flapping detection. Port flapping detection will disable any ports that flap more than 15 times in less than 15 seconds. This limits the impact of an unreliable link.
platform stop-unreg-mc-flooding	New	Y	Y	Y	Y	N	N	N	Switching Commands	This command stops multicast packets flooding out of all the ports until these packets are registered. This command can be used to stop the initial flood of multicast packets that happens when a new multicast source, such as an IP camera, starts to send traffic.
switch card provision	New	N	N	N	N	N	N	Y	Switching Commands	This command pre-configures a specified empty card slot within a specified chassis ready for inserting a particular card type.

Table 7: New and modified commands in 5.4.4(cont.)

Command	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
show system mac	New	Y	Y	Y	Y	Y	Y	Y	System Configuration and Monitoring Commands	This command displays the physical MAC address available on a stack, or a standalone switch, or a chassis. This command also shows the virtual MAC address for a stack if the stack virtual MAC address feature is enabled with the stack virtual-mac command.

Table 8: New and modified SNMP MIBs in 5.4.4

MIB	Status	x210	IX5	x510	x610	x900	SBx908	SBx8100	Software Reference Chapter	Description
AT-ATMF-MIB	New	Y	Y	Y	Y	Y	Y	Y	SNMP MIBs	The ATMF-MIB defines objects for managing ATMF objects and triggers. Objects in this group have the object identifier ATMF ({ modules 603 })
AT-FILEv2-MIB	Obsoleted	Y	Y	Y	Y	Y	Y	Y	SNMP MIBs	The object atFilev2InfoTable was obsoleted in AT-FILEv2-MIB.

Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch

Release licenses are applied with the `license certificate` command, then validated with the `show license` or `show license brief` commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the `show system mac license` command to show the switch MAC address for release licensing.:

```
awplus#show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the `license certificate` command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked switch, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches.:

```
awplus#show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Dec-2013
License expiry date : N/A
Features included : EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64,
                  RADIUS-100, RIP, VRRP

Index          : 2
License name    : 5.4.4-r1
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 01-Oct-2013
License expiry date : N/A
Release        : 5.4.4
```


Licensing this Software Version on a Control Card on an SBx8100 Series Switch

Release licenses are applied with the `license certificate` command, then validated with the `show license` or `show license brief` commands. Follow these steps:

- Obtain the MAC address for a control card
- Obtain a release license for a control card
- Apply a release license on a control card
- Confirm release license application

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the `license certificate` command on the stack master will automatically apply the release licenses to all the control cards within the stack.

Step 1: Obtain the MAC address for a control card

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the `show system mac license` command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The Chassis MAC address is not used for release licensing. Use the Card MAC address for release licensing.

```
awplus#show system mac license
```

```
MAC address for licensing:
```

Card	MAC Address
1.5	eccd.6d9e.3312
1.6	eccd.6db3.58e7
Chassis MAC Address eccd.6d7b.3bc2	

Step 2: Obtain a release license for a control card

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a control card

Use the `license certificate` command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license

1 license installed.
```

Step 4: Confirm release license application

On a stand-alone chassis, use the commands [show license](#) or [show license brief](#) to confirm release license application.

On a stacked chassis, use the command [show license member](#) or [show license brief member](#) to confirm release license application.

From version 5.4.4, the [show license](#) command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus#show license
OEM Territory : ATI USA
Software Licenses
-----
Index          : 1
License name    : Base License
Customer name   : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Dec-2013
License expiry date : N/A
Features included : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100
                  Virtual-MAC, VRRP

Index          : 2
License name    : 5.4.4-rl
Customer name   : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 01-Oct-2013
License expiry date : N/A
Release         : 5.4.4
```

Installing this Software Version

Caution: Software version 5.4.4 requires a release license. Ensure that you load your license certificate onto each switch before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- [“Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 289](#) and
- [“Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 291.](#)

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.
2. If necessary, delete or move files to create space in the switch’s Flash memory for the new file. To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.

```
awplus# copy tftp flash
```

Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:

```
awplus#configure terminal
```

Then set the switch to reboot with the new software version:

Switch	Command
x210 series	<code>awplusawplus(config)# boot system x210-5.4.4-0.1.rel</code>
IX5-28GPX	<code>awplusawplus(config)# boot system IX5-5.4.4-0.1.rel</code>
x510 series	<code>awplusawplus(config)# boot system x510-5.4.4-0.1.rel</code>
x610 series	<code>awplusawplus(config)# boot system x610-5.4.4-0.1.rel</code>
x900 series	<code>awplusawplus(config)# boot system x900-5.4.4-0.1.rel</code>
SBx908	<code>awplusawplus(config)# boot system SBx908-5.4.4-0.1.rel</code>
SBx8100 with CFC400	<code>awplusawplus(config)# boot system SBx81CFC400-5.4.4-0.1.rel</code>
SBx8100 with CFC960	<code>awplusawplus(config)# boot system SBx81CFC960-5.4.4-0.1.rel</code>

Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus(config)#exit
```

```
awplus# show boot
```

-
5. Reboot using the new software version.

```
awplus# reload
```

Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (**.jar**) gives the earliest version of the software file (**.rel**) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- PC Platform:
Windows XP SP2 and up / Windows Vista SP1 and up
- Browser: (must support Java Runtime Environment (JRE) version 6)
Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (**.jar** extension) onto your TFTP server, SD card or USB storage device.
2. Connect to the switch's management port, then log into the switch.
3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.

To see the memory usage, use the command:

```
awplus# show file systems
```

To list files, use the command:

```
awplus# dir
```

To delete files, use the command:

```
awplus# del <filename>
```

You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# interface vlan1
```

```
awplus(config-if)#ip address <address>/<prefix-length>
```

Where *<address>* is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:

```
awplus(config-if)# ip address 192.168.2.6/24
```

5. If required, configure a default gateway for the switch.

```
awplus(config-if)# exit
```

```
awplus(config)# ip route 0.0.0.0/0 <gateway-address>
```

Where *<gateway-address>* is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.

6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.

TFTP server: Use the command:

```
awplus# copy tftp://<server-address>/<filename.jar> flash:/
```

SD card: use the command:

```
awplus# copy card:/<filename.jar> flash:/
```

USB storage device: use the command:

```
awplus# copy usb:/<filename.jar> flash:/
```

where <server-address> is the IP address of the TFTP server, and where <filename.jar> is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:

```
awplus# configure terminal
```

```
awplus(config)# service http
```

The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.

```
awplus(config)# username <username> privilege 15 password  
                  <password>
```

You can create multiple users to log into the GUI. For information about the **username** command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser

On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.

Next, click on the 'Security' tab. Ensure the 'Enable Java content in the browser' checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List

Click on the 'Edit Site List' button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the 'Exception Site List' dialog, enter the IP address you configured in Step 4, with a http:// prefix.

After entering the URL click the Add button then click OK.

11. Log into the GUI.

Start a browser and enter the switch's IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.